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IMPACT OF THE REPEAL OF THE KANSAS MANDATORY MOTORCYCLE HELMET LAW

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16. Abstract

The State of Kansas repealed its mandatory motorcycle helmet law effective July 1, 1976. This project was designed to evaluate the effects of the repeal of this law, through a retrospective analysis of the incidence and severity of injuries to those motorcyclists involved in accidents before and after the repeal of the law. Within the boundaries of a representative study area, data concerning accidents and injuries was gathered for a study period of stable motorcycle usage during both 1975 and 1976. In addition, an observational survey was completed during 1977 to determine current usage of motorcycle helmets and/or eye protection.

The findings indicate an overall usage of motorcycle helmets by 47.1% of those observed. Some form of eye protection was in use by 70.2% of those observed.

The data indicates that statistically significant increases in the incidence and severity of injuries to the head and to the general body occurred between the pre-repeal and post-repeal periods. Extremely significant increases in the incidence and severity of head injuries and general body injuries are found when those persons who were involved in a motorcycle accident while wearing a helmet are compared to those persons who were involved in accidents without benefit of a helmet. The data also indicates that the crude death rate for those involved in motorcycle accidents without helmet protection is significantly higher than the crude death rate for those persons who are involved in motorcycle accidents while wearing a helmet.

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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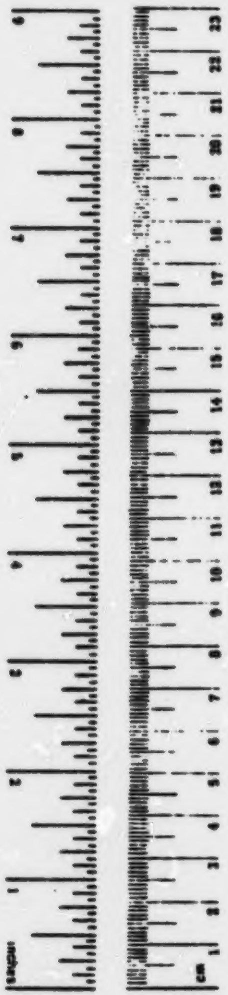
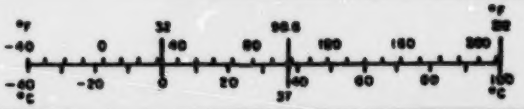
*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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IMPACT OF THE REPEAL OF THE KANSAS MANDATORY MOTORCYCLE HELMET LAW

SECTION 1. INTRODUCTION

Motorcycle use in America increased dramatically during the years following World War II. During the 27-year period from 1950 to 1976, the number of registered motorcycles in the United States increased more than 1200 per cent, from 453,874 registered motorcycles in 1950, to more than 6,100,000 registered motorcycles in 1976. Urban states, such as California recorded the most dramatic increase (1) of more than 900 per cent from 1950 to 1970. In the state of Kansas, with a more rural, conservative population, registration of motorcycles increased at a much slower rate. The primary growth of registrations of motorcycles in Kansas occurred during the 11-year period from 1965 to 1975, when an increase of 313 per cent was recorded. Between 1975 and 1976, motorcycle registrations in the state of Kansas actually decreased, from 90,329 registered motorcycles in 1975, to 86,789 registered motorcycles in 1976, a decrease of approximately 4 per cent.

1.1 Motorcycle Accidents

Nationally, the increase in the number of motorcycle registrations has been responsible for a corresponding increase in the number of motorcycle accidents, injuries subsequent to motorcycle accidents, and resultant fatalities. In 1965, nationally, there were 1,515 fatalities (2) subsequent to motorcycle accidents, while in 1976, there were more than 3,000 fatalities. In the state of Kansas, during these years, the numbers of accidents ranged from a low of 570 motorcycle accidents in 1965, to a high of 2,106 in 1973. During 1976, there were 1976 motorcycle accidents recorded in Kansas. During these same years, fatalities resulting from motorcycle accidents ranged from a low of 14 fatalities in 1967 to a high of 48 fatalities in 1976. A tabulation of the relationship between motorcycle registrations, motorcycle accidents and fatalities subsequent to these accidents, for the years 1965 to 1976 is shown in Table 1-1.

TABLE 1-1

STATE OF KANSAS

RELATIONSHIP OF FATALITIES SUBSEQUENT TO MOTORCYCLE ACCIDENTS TO MOTORCYCLE REGISTRATIONS AND MOTORCYCLE ACCIDENTS

YEAR	MOTORCYCLE REGISTRATIONS	FATALITIES	MOTORCYCLE ACCIDENTS	CRUDE DEATH RATE PER 1000 ACCIDENTS	CRUDE DEATH RATE PER 1000 REGISTRATIONS
1965	21,881	20	570	35.0	.91
1966	28,015	19	969	19.6	.68
1967	31,538	14	1107	12.6	.44
1968	34,336	30	994	30.1	.87
1969	39,835	19	788	24.1	.48
1970	53,847	24	1128	21.3	.45
1971	74,525	30	1476	20.3	.40
1972	88,894	22	1829	12.0	.25
1973	99,499	42	2106	19.9	.42
1974	92,354	46	1975	23.3	.50
1975	90,329	38	1867	20.3	.42
1976	86,789	48 *	1976	24.3	.55
1977	84,502	55	2261	24.3	.65

* During 1976, one fatality occurred in conjunction with a police roadblock, and was not included in the KDOT printout of accidents. It has been included in these figures.

Most statistics that relate to motor vehicle accidents and subsequent fatalities, indicate that the rates for Kansas are consistently lower than the corresponding rates for the entire United States. As an example, the combined accident rates for the years 1975 and 1976, considering all motor vehicles, was 31.70 accidents per 1,000 registered motor vehicles, in Kansas, while it was 117.73 accidents per 1,000 registered motor vehicles in the United States. (3) The mean fatality rate for Kansas, for the combined years of 1975 and 1976, is 26.85 fatalities per 100,000 registered motor vehicles. The corresponding rate for the United States for the combined years, is 32.99 fatalities per 100,000 registered motor vehicles.

The following statistics illustrate the pattern of motorcycle accidents in Kansas, as well as subsequent fatalities, for the years from 1975 to 1977. The last complete year of the mandatory motorcycle helmet law was 1975, and the first complete year without the law was 1977. Between these two years there was a decrease in the number of Kansas motorcycle registrations from 90,329 to 84,502, a net loss of some 6.4 per cent. During the same two years there was an increase in the number of motorcycle accidents from 1,867 during 1975 to 2,261 in 1977, a gain of some 21.1 per cent. In 1975 there were 38 fatalities subsequent to motorcycle accidents. In 1977 there were 55 fatalities subsequent to motorcycle accidents, an increase of 44.7 per cent. In order to adequately consider these figures, the fatalities may be converted to rates resulting in a net gain as follows. Between 1975 and 1977 there was a 29.5 per cent increase in the incidence of motorcycle accidents based on registrations, from 20.7 accidents per one thousand registered motorcycles in 1975 to 26.8 accidents per one thousand registered motorcycles in 1977. During the same two years there was a 20.0 per cent increase in the incidence of fatal accidents based on total accidents, from 20.3 fatalities per one thousand accidents in 1975 to 24.3 fatalities per one thousand accidents in 1977. To summarize, the ratio of accidents to registrations has increased resulting in a net increase of 55.0 per cent in the incidence of fatalities based on registrations, from .42 fatalities per one thousand motorcycle registrations during 1975 to .65 fatalities per one thousand motorcycle registrations during 1977. The data to support these statistics is contained in table 1-1 and is specifically illustrated in tabular form in table 1-2. Figures 1-3, 1-4, and 1-5 present Kansas motorcycle accident rates for 1965 through 1977 and the Kansas fatality rate based on two separate denominators, the total population of the state and the population involved in motorcycle accidents during each year.

TABLE 1-2

RELATIONSHIP OF FATALITIES SUBSEQUENT TO MOTORCYCLE ACCIDENTS COMPARISON OF SELECTED RATES FOR 1975 AND 1977

TYPE OF RATE	1975 RATE	1977 RATE	% OF CHANGE
Total Motorcycle Registrations	90,329	84,502	- 6.4%
Fatalities /1000 Registrations	.42	.65	+ 55.0%
Fatalities /1000 Accidents	20.30	24.30	+ 20.0%
Accidents /1000 Registrations	20.7	26.8	+ 29.5%

FIGURE 1-3

KANSAS MOTORCYCLE ACCIDENT RATES

1965 - 1977

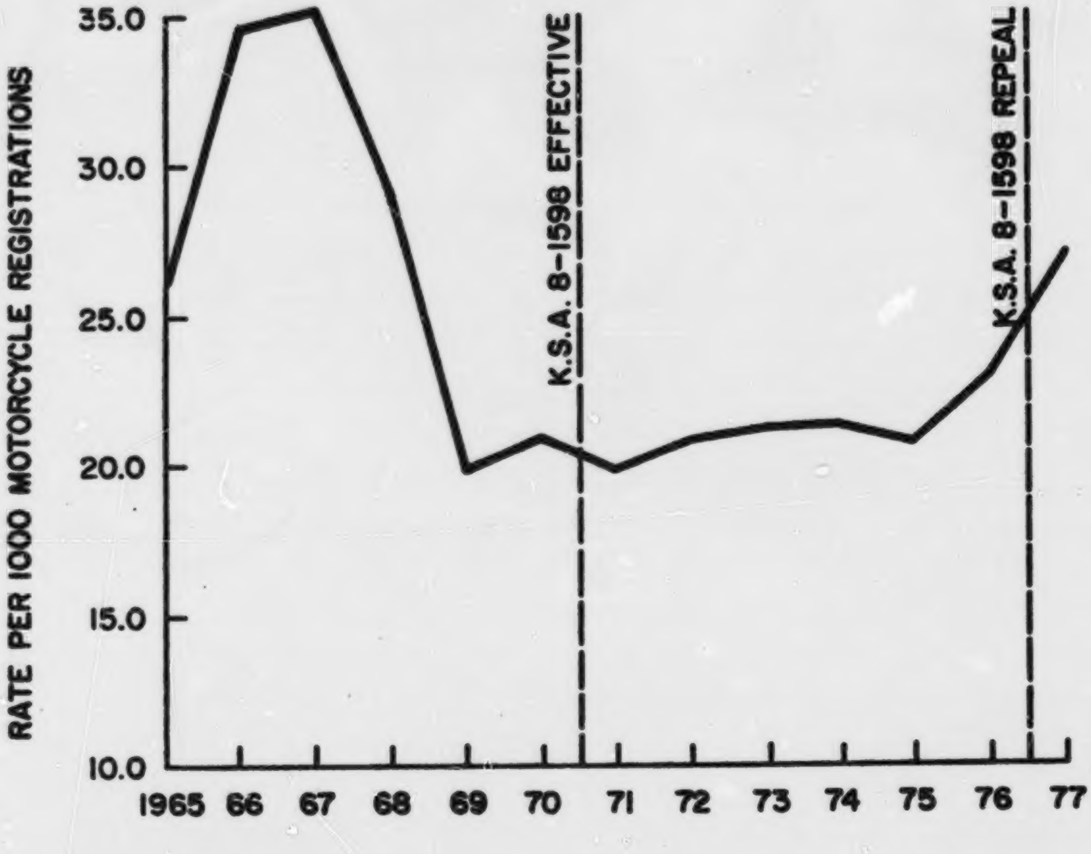


FIGURE 1-4

FATALITY MOTORCYCLE ACCIDENT RATES
1965 - 1977

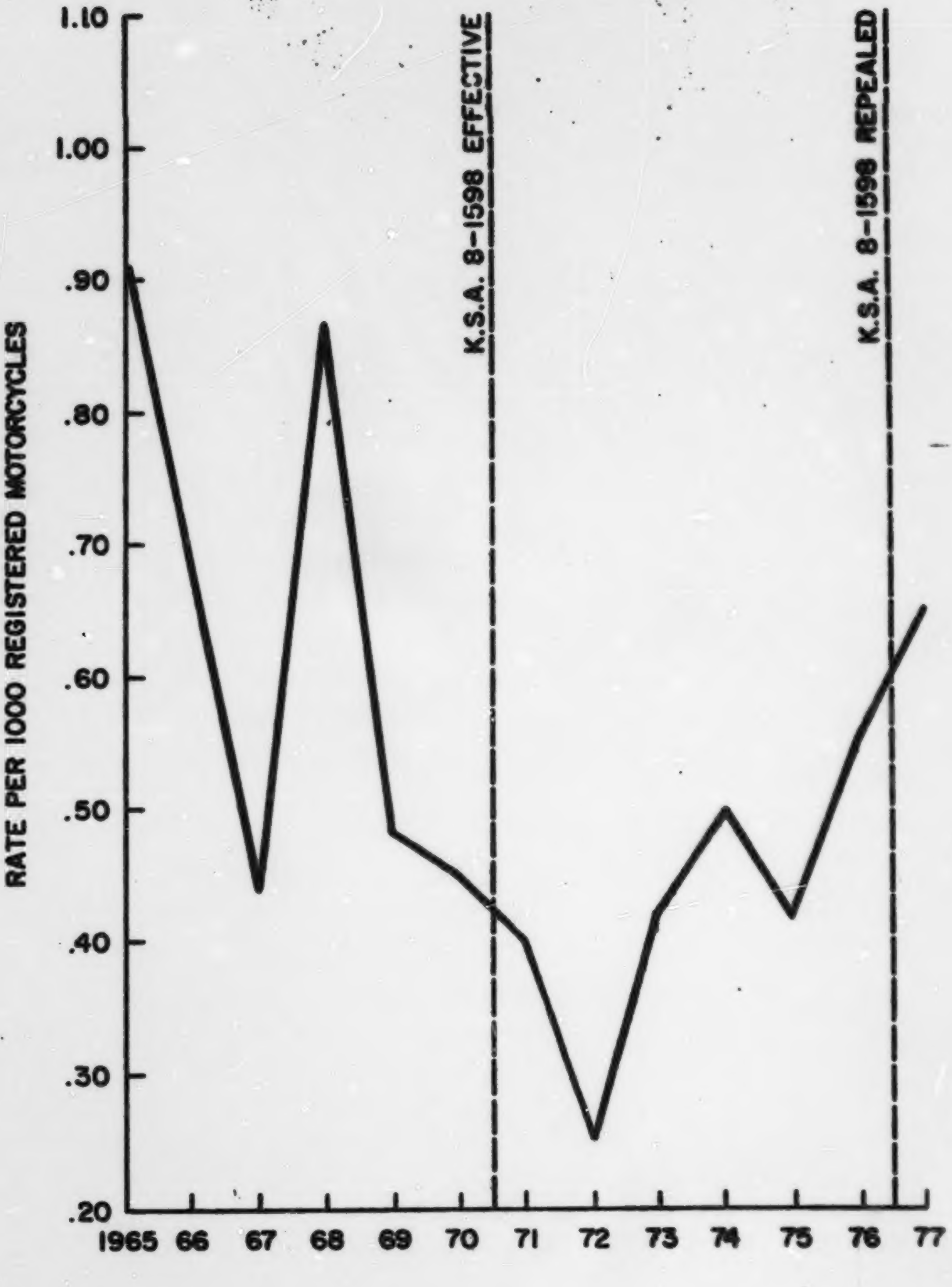
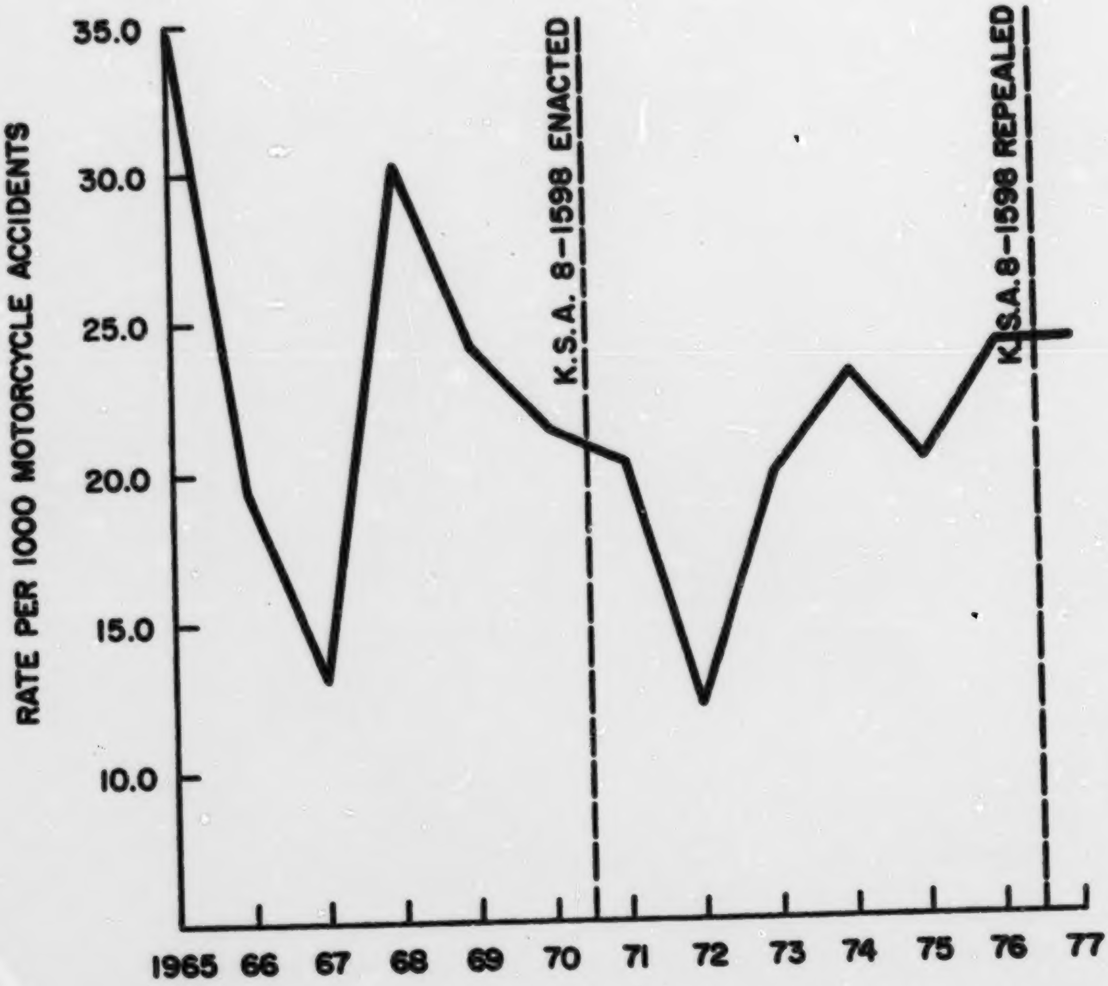


FIGURE 1-5

FATALITY MOTORCYCLE ACCIDENT RATES
1965 - 1977



1.2 Legislation

Efforts to control the increasing problem of fatalities subsequent to motorcycle accidents have taken several forms. The most popular measure, but also the most controversial has been the adoption of mandatory helmet laws requiring both drivers and passengers of motorcycles to wear approved helmets. A comprehensive testing program to set design standards for motorcycle helmets was first initiated in 1957. These standards eventually became the basis for the Federal Motor Vehicle Safety Standard number 218 adopted on March 1, 1974 and the American National Standards Institute Z90.1 requirement. In effect, these standards define the legal status of an "approved" helmet. The National Highway Traffic Safety Administration included a motorcycle safety standard in the thirteen Highway Safety Program Standards in 1967. This standard, number 3, required each state to develop a safety program which would require that each motorcycle operator would be equipped with an approved safety helmet and eye protection. The provision also was extended to passengers on motorcycles. The state of Kansas, responded in 1968 with an initial motorcycle helmet law which was later modified to include only those persons under 21 years of age. The Kansas comprehensive motorcycle helmet law, KSA 8-1598 adopted with an effective date of July 1, 1971, states:

> "No person shall operate or ride upon a motorcycle unless he is wearing protective head gear which complies with standards established by the Secretary of Transportation.
>
> (b) No person shall operate a motorcycle unless such person is wearing eye protective device of the type approved by the Secretary of Transportation, except when the motorcycle is equipped with a wind screen."

This legislation allowed the Secretary of the Kansas Department of Transportation to set the standards for both helmets and face protection. In effect, those standards set by the state of Kansas were the standards referred to earlier, as set by the Federal Motor Vehicle Safety Standards.

The balance of the states enacted some form of comprehensive motorcycle helmet use law. These laws varied a great deal from state to state, but essentially, they required the riders and passengers of motorcycles to wear approved helmets and face protection. In many cases states also required that these helmets be secured with a chin strap.

Reaction to these laws was direct and very effective. Pressure was put on legislators and officials of both state and federal governments, on the basis that the mandatory helmet laws are in violation of personal freedoms. On July 31, 1975 the Department of Transportation initiated proceedings in three states which had failed to comply with standard number 3. These proceedings were effectively dropped when Congress prohibited any sanctions against those states who were not complying with the federal standards. During the following year, 1976, the National Highway Safety Act prohibited the Secretary of the United States Department of Transportation from initiating sanctions against any state which failed to implement regulations based on National Highway Traffic Safety Administration program standards. This in effect lead the way for organizations such as ABATE (A Brotherhood Against Totalitarian Enactments) and other organizations to lobby for the repeal of mandatory motorcycle helmet laws. Subsequently, Kansas Statute KSA 8-1598 was repealed effective July 1, 1976.

Section 1.3 Opportunity For Investigation

The repeal of mandatory motorcycle helmet laws has been seen by many individuals as a victory. Those who favor a mandatory law have contended, however, that Kansas, and other states which have repealed their helmet laws, will see an immediate increase in the number of deaths and long term disabilities resulting from motorcycle accidents. Regardless of which position is taken, it must be recognized that this event presents an opportunity to conduct comprehensive evaluations of the effectiveness of such legislation. The obvious methodology for conducting such an evaluation is to compare the incidence and severity of injuries suffered by those involved in motorcycle accidents before and after the repeal of the motorcycle helmet law within a defined geographic region. In order to conduct such a study a standardized format is needed to assess the extent of injuries suffered by victims of accidents, and to assign these injuries numerical values. Fortunately such a scoring system is presently in use in the United States.

1.4 The Abbreviated Injury Scale (AIS)

During 1969 the American Medical Association committee on Medical Aspects of Automotive Safety sponsored an intensive three day workshop for the development of a single, effective and simple injury scoring system, based on scientific criteria. The result of this workshop was the Abbreviated Injury Scale (AIS) which was initially published in 1971. This scale has been revised and updated in a 1976 version. Susan Baker, MPH., et.al., (4,5) has studied the use of the Abbreviated Injury Scale to determine the extent to which the ratings correlate with patient mortality. This analysis led to the development of an adjustment for multiple injuries called the Injury Severity Score (ISS) which provides a valid method for describing the overall severity of injury to patients with multiple body areas injured. The basis for the Abbreviated Injury Scale is a categorization of the extent of injury which can be applied to one of six body regions. This categorization allows a numeric value to be placed on each injury suffered by an individual who is involved in an accident. The numeric codes and the categories for the AIS are as follows:

0	No Injury
1	Minor Injury
2	Moderate Injury
3	Severe Injury (Not Life-Threatening)
4	Serious (Life Threatening, Survival Probable)
5	Critical (Survival Uncertain)
6	Maximum (Currently Not Treatable)

It will be noted that this scale is not designed to record fatal episodes. The initial Abbreviated Injury Scale included fatal injury codes, assigning numeric value of 6, 7, 8, or 9 depending upon the specifics of the injury. In practice, however, the Abbreviated Injury Score proved to be most beneficial for the evaluation of individual injuries. As a result, specific knowledge of the severity of injury must be available, so the assignment of codes 7, 8, and 9 has been eliminated and to a large degree, the use of code 6 has also been eliminated.

A clear distinction has also been made between the actual injury which is evaluated and recorded as opposed to the results of the injury, which are not recorded. An example would be the patient who suffers a pneumothorax as the result of an automobile accident. Utilization of the Abbreviated Injury Score does not record the pneumothorax, but rather, would record a score for the specific injury, such as laceration of the chest wall or contusion to the lung which would receive a specific numeric designation when using the AIS.

The Abbreviated Injury Scale is utilized by assigning a numeric code score to one of six regions of the body. These regions are as follows:

1. Head or neck
2. Face
3. Chest
4. Abdominal or pelvic contents
5. Extremities or pelvic girdle
6. General (external)

In regard to the specific definition of these body regions, head or neck injuries include injury to the brain or cervical spine, skull or cervical spine fractures, or muscular injuries to the cervical spine. Facial injuries include those involving the soft tissue of the head, eyes, ears, nose, or the facial bones. Injuries to the chest or abdomen include all soft tissue injuries in appropriate areas plus the internal injuries contained in the appropriate area. Chest injuries include those which affect the thoracic spine, while lumbar spine injuries are included in the abdominal or pelvic category. Injuries to the extremities or the pelvic or shoulder girdle would include all soft tissue injuries, dislocations, fractures and amputations, with the exception of those affecting the vertibral column, the skull or rib cage. The category of general injuries applies to all external injuries such as lacerations, contusions, abrasions, or burns. Categorization of these injuries is independent of the injury location on the body.

The Abbreviated Injury Scale (AIS) is an assessment of specific injuries suffered by the victim of trauma as pointed out in a previous paragraph. The specific injury, not the effects of the specific injury provide the criteria for scoring. In addition to the Abbreviated Injury Scale another scale called the Overall Abbreviated Injury Scale (OAIS) is not an assessment of specific injuries, but rather is an attempt to measure the effect of multiple systems injuries. The OAIS does not rely on specific scales but rather, relies on the clinical judgement of the person who is making the score. In the case of single injuries the OAIS is identical to the AIS. In the case of multiple injuries, however, the OAIS code assigned is a judgement decision which does not present a sum, median, or average of the scores assigned to the individual injuries. Because the OAIS is strictly a clinical judgement, it has fallen into disfavor and is not presently being used by serious investigators of trauma. The use of this scoring system might be appropriate for an individual physician or group of physicians working together who see great numbers of similar cases. An example of this would be a physician or group of physicians in charge of a burn unit which serves a major geographic area. In this instance the OAIS might provide a valuable tool for assessing the overall injuries suffered by the burn victims. In the case of a retrospective study, involving a large number of victims seen in many institutions by different physicians, the OAIS seems to be of little value. As a result, it has not been used in this study.

1.5 DEVELOPMENT OF THIS STUDY

As noted in an earlier paragraph, the repeal of the

Kansas Motorcycle Helmet law presents an opportunity to evaluate the effects and/or effectiveness of such legislation. In order to accomplish this task, the Emergency Medical Training Program, School of Allied Health, University of Kansas College of Health Sciences, developed a grant application to carry out a retrospective comparison including time periods before and after the effective repeal of the law (July 1, 1976). This grant application was submitted to the United States Department of Transportation/National Highway Traffic Safety Administration, and was subsequently funded for one year under contract DOT-HS-7-01563. This report presents an analysis of the data collected in this study.

1.6 Objectives of This Study

Four primary objectives were identified and defined for this study:

Objective I: To collect motorcycle accident data from law enforcement authorities for July, August and September of 1975 and July, August and September of 1976.

The purpose of this study is to determine the incidence and severity of head trauma sustained by those involved in motorcycle accidents during the three month period prior to the repeal of the Kansas Statute KSA 8-1598, and to compare this data with similar data collected during a three month period following the repeal of this statute.

Objective II: To determine the frequency and severity of injury to specific body areas sustained by those involved in motorcycle accidents.

Following determination of the physical data concerning injury accidents, specific accident reports were examined to determine the location of the hospital to which the accident victims were taken. Following this identification, the Abbreviated Injury Scale (AIS) was used to determine a relative degree of injury for each person who presented themselves at a health care facility for treatment subsequent to motorcycle accidents.

Objective III: To compare and contrast specific numbers and categories of injuries sustained by those involved in motorcycle accidents during the two time periods described in Objective I.

The initial purpose for this objective was to compare specific scores and categories of injuries between 1975 and 1976. After completion of this phase of the study, the figures were compared in a similar fashion for the group defined as wearing motorcycle helmets at the time of accident, compared with the group who were not wearing helmets at the time of the accident.

Objective IV: To determine current helmet usage through observational surveys on representative roadways at appropriate times.

Since this was a retrospective study, only current motorcycle helmet usage could be determined. As a result, valid figures exist only for the post-repeal period.

SECTION 2. STUDY METHODOLOGY

2.1 Scope of the Study - Demographics

Work on the Kansas Motorcycle Helmet Study, performed through contract DOT-HS-7-01563, commenced on February 1, 1977. After five contract modifications, the study has now been expanded and extended through August 31, 1979. This section deals with a report concerning the initial contract, which considered trauma subsequent to motorcycle accidents during the three-month period of July, August and September, for the years 1975 and 1976. This time sequence included a three-month period during the year prior to the repeal of the Kansas Motorcycle Helmet Law, KSA 8-1598, and a three-month period of time immediately following the repeal of the law on July 1, 1976.

The state of Kansas consists of 81,787 square miles, bordered roughly on the east by the Missouri River Valley and on the West by the foot hills of the Rocky Mountains. Mean elevation above sea level is approximately 800 feet at the Eastern border and approximately 3,500 feet at the Western border. Kansas is essentially a rural state. The state economy is primarily dependent upon agriculture and industries that relate to agriculture. Report of the 1970 census, however, indicates that approximately 66 per cent of the states' population resides in urban settings while the balance of 34 per cent reside in rural settings.

By most demographic standards, the population of Kansas compares quite favorably with the balance of the United States. An illustration of population distribution by age is provided in figure 2-1. Other statistics which illustrate the fact that Kansas is demographically similar to the balance of the United States include the median age, which is 28.7 years for Kansas while the figure for the United States is 28.1 years. Kansas, which represents 1.085 per cent of the total population of the United States, accounted for 12.373 million dollars in total personal income during 1974. This figure represents 1.09 per cent of the total personal income for the United States. The per capita personal income for Kansas for 1974 was $ 5,615.00, which is 102.4 per cent of the per capita personal income figure for the United States, which is $ 5,434.00.

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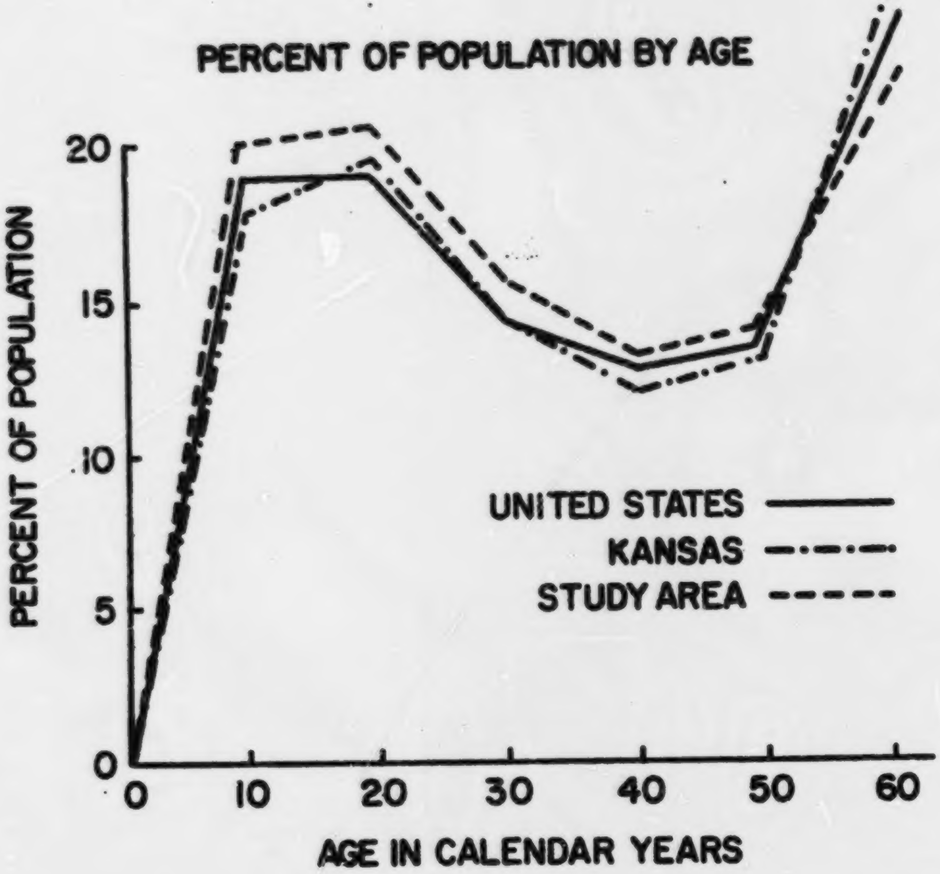
FIGURE 2-1

AGE DISTRIBUTION OF POPULATION
THE UNITED STATES, KANSAS AND THE STUDY AREA



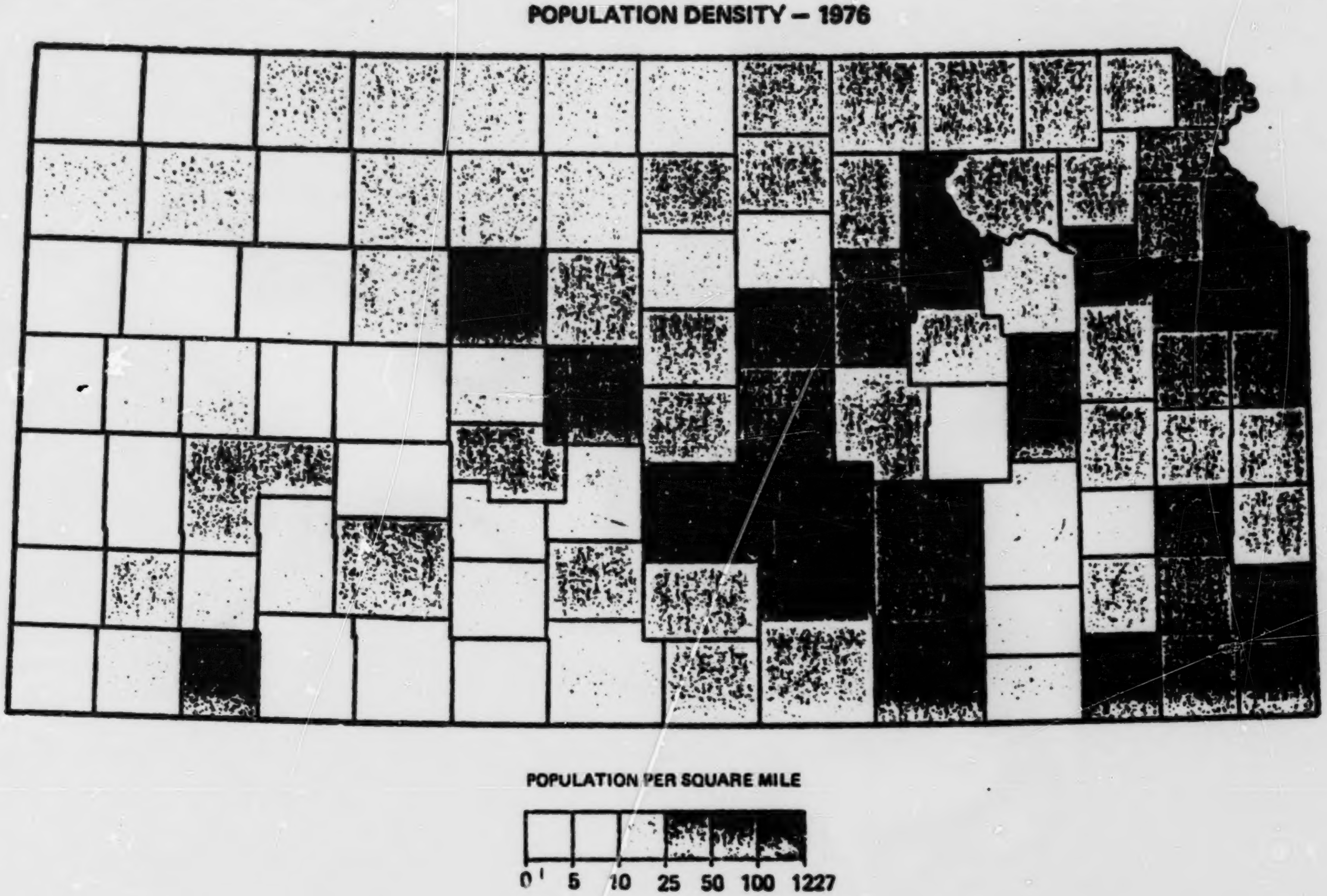
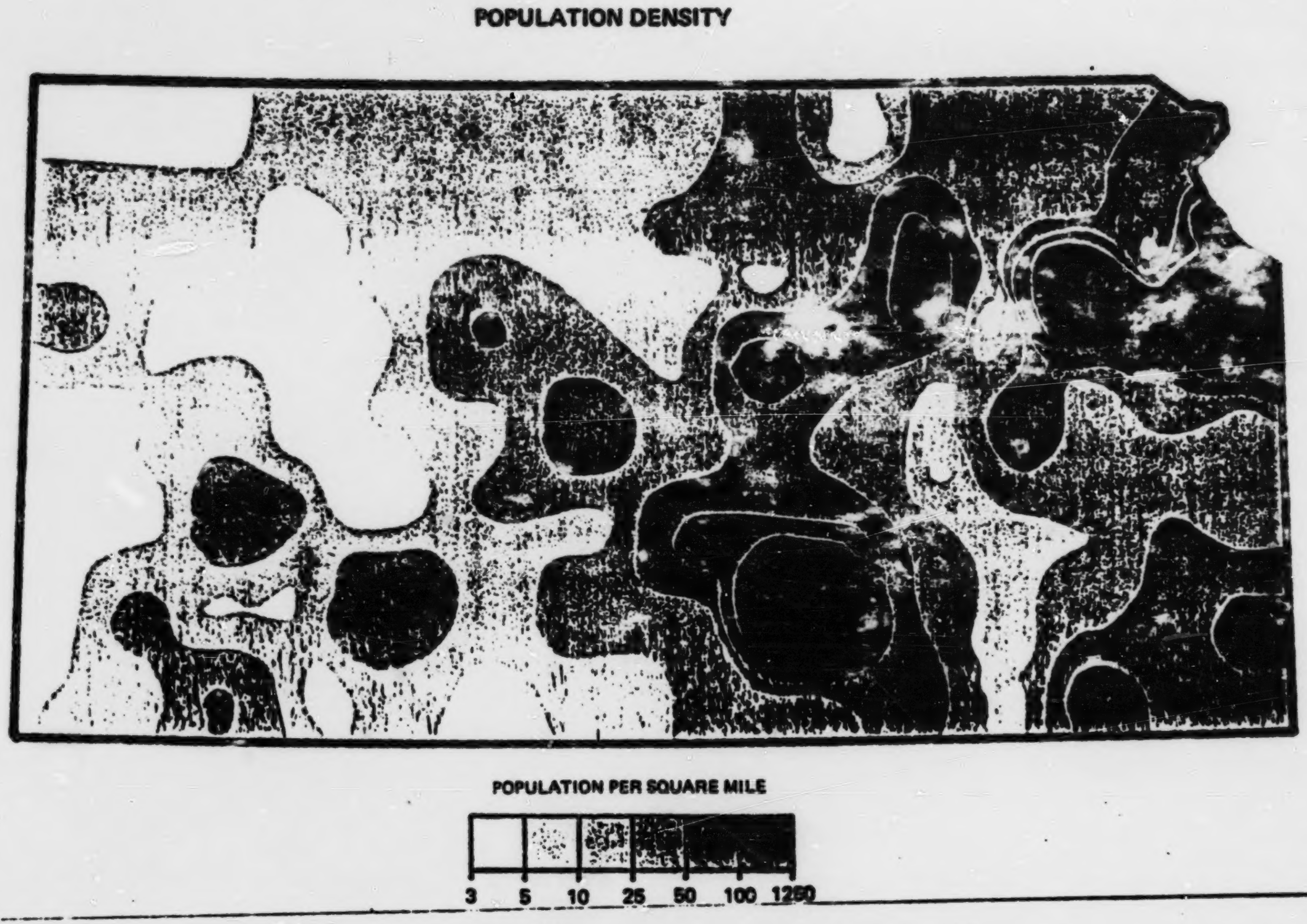


FIGURE 2-2
KANSAS POPULATION DENSITY BY COUNTY

FIGURE 2-3

KANSAS POPULATION DENSITY BY DISTRIBUTION



The population of Kansas is distributed in an extremely diverse manner, with the general concentration of population in counties in South-central and Northeastern Kansas. Please refer to Figures 2-2 and 2-3 for this factor. The population density ranges from less than 5 individuals per square mile in extreme Southwestern Kansas to more than 1,000 individuals per square mile in the heavily populated counties surrounding the Kansas City area. The rates for registered live births and total deaths based on population, are quite similar for the state of Kansas and the United States, but perhaps more significantly, the 1975 cause specific death rate per 100,000 population for accidental death, for the state of Kansas is 48.3 deaths per 100,000 population, while the rate for the entire United States is 48.4 deaths per 100,000 population.

In summary, during 1975, Kansas contained 1.085 per cent of the total population of the United States. During the same year, 1.431 per cent of all the registered motor vehicles in the United States were owned by residents of the state of Kansas. During this same year, Kansas contained 1.819 per cent of the registered motorcycles within the United States. During the year preceding this study, 1974, 1.43 per cent of the motor vehicle related fatalities occurring in the United States were within the borders of the state of Kansas. During this same time period, 1.46 per cent of the total fatalities associated with motorcycles in the United States occurred within the geographic boundaries of the state of Kansas.

Because of the diversity described above, the geographic boundaries of this study were limited to four of the 105 Kansas counties. This primary study area consisted of Johnson, Sedgwick, Shawnee and Wyandotte counties, which surround the three largest cities in the state of Kansas, Topeka, Wichita and Kansas City. Another factor that influenced the selection of this study area was the availability of central access to medical records within the geographic boundaries of the study area. This area consists of 2.7 per cent of the surface area of the state, but it contains

30.7 per cent of the population of the state of Kansas. This study area contains approximately 35 per cent of the registered motorcycles in the state of Kansas. With the exception of the population density, which is approximately 10 times greater in the study area than for the balance of the state of Kansas, other demographic characteristics are similar. Within the geographic boundaries of the study area, 90 per cent of the population resides in an urban setting while the balance of 10 per cent reside in a rural area. Table 2-4 presents a summary of events relative to motor vehicle accidents that points out the similarity in share of events relative to motorcycle accidents.

TABLE 2-4

KANSAS PER CENT SHARE OF EVENTS RELATIVE TO MOTOR VEHICLE ACCIDENTS

	1975	1976
POPULATION	1.09%	1.08%
MOTOR VEHICLES	1.43%	1.44%
MOTORCYCLES	1.82%	1.70%
MOTOR VEHICLE ACCIDENTS	.38%	.39%
MOTOR VEHICLE FATALITIES	1.13%	1.21%
MOTORCYCLE FATALITIES	1.36%	1.60%

2.2 Data Collection

The inital step in the study was to obtain general accident information relating to the numbers, types and locations of accidents involving motorcycles in the geographic and time boundaries of the study. The Kansas Department of Transportation through its Safety Section maintains a department responsible for compiling general accident data in Kansas. Initially, this Safety Research Section was able to provide a computer analysis of all recorded motorcycle accidents in the state of Kansas for the years involved in the study. This analysis included such items as locations, times, numbers and types of vehicles involved, road conditions, number of riders, and the rough determination of the extent of injuries suffered by those involved. This computer analysis was based on accident reports which had been received by the Department of Transportation from local and county law enforcement agencies.

The state of Kansas utilizes a standard accident report form for all motor vehicle accidents. During the time boundaries of the study there were actually two versions of the report in general use. Information contained is essentially identical and copies of each of these forms are included in the appendix.

The standard accident report form does not provide any information pertaining to helmet status of non-injured passengers who are involved in motorcycle accidents. Since this study was done on a retrospective basis it was not possible to obtain this information.

Copies of each accident form are retained and the appropriate information is entered in the Kansas Department of Transportation computer system. Much of the retained information from computer analysis from the individual accident report forms was useful to this study. The data concerning injury, however, was found to be nearly useless. Data collected on the standard report form regarding injury is as follows:

ACCIDENT SEVERITY
(Most Severe Injury)

0	No Injury
1	Fatal Injury
2	Incapacitating Injury
3	Non-Incapacitating Injury
4	Possible Injury

Because of a lack of training in emergency medical care, on the part of most law enforcement officers, this information is not reliable for any purpose other than the identification of possible victims of motorcycle accidents.

The privacy of the information contained in these report forms is protected by law. The Kansas Public Records Act, KSA 45-201, requires that any record completed by a responsible public official must be available to a legitimate research program. As a result, the entire files of the Kansas Department of Transportation were available to the study, and copies of all motorcycle accident reports within the geographical boundaries, as well as for the balance of the state were provided. These forms were subsequently utilized to identify motorcycle accidents in the geographic boundaries and time frames of this study.

One additional step which was necessary to insure that all victims of motorcycle accidents were identified and included in this study. In order to insure that all victims of motorcycle accidents are included in the study, as a precautionary measure, study personnel examined the logs of the emergency rooms of all hospitals within the study area. This measure insured that all victims of motorcycle accidents were properly identified and included in the study.

During the months of July, August and September of 1975, the study area contained 26.3 per cent of the motorcycle accidents in the state of Kansas, and 35.3 per cent of the fatalities related to motorcycle accidents, during the same period. During the same months in 1976, the study area contained 45.1 per cent of all motorcycle accidents in the state of Kansas, and also contained 48.0 per cent of the fatalities subsequent to those accidents.

2.3 Injury Severity Data

Following determination of those victims of motorcycle trauma who were included in the study, it was necessary to utilize a system to identify the location and severity of injuries suffered by these individuals. As descussed earlier, the Abbreviated Injury Scale (AIS) was initially developed in 1969, and has been widely used in efforts to standardize the categorization of traumatic injury. On the basis of the 1976 version of the Abbreviated Injury Scale, a minor modification was made. This modification was accomplished by combining body regions for the head and face, and treating neck injuries as a seperate category. As a result, the categories used in this study are as follows:

1 Head or Face
2 Neck and Cervical Spine
3 Chest and Thoracic Spine
4 Abdomen or Lumbar Spine
5 Pelvis or Extremities
6 General Body (External)

Two primary reasons existed for treating the neck as a separate category. The first is the amount of speculation that exists concerning the incidence of trauma to the neck, subsequent to the weight of the motorcycle helmet. While this argument has been largely disproved, the decision was made to treat the neck as a separate category in order to ascertain if there were any significant differences between neck injuries with or without helmets. A second rationale is the makeup of the index included with the 1976 version of the Abbreviated Injury Scale. This index includes facial injuries in the category of head, and treats neck injuries as a separate category.

In order to utilize this modification of the Abbreviated Injury Scale a form was developed (a copy is included in the appendix) to allow the rapid and accurate scoring of injury to body areas. This form which classifies injuries as described above includes other information that was considered pertinent to the study.

In order to implement this scoring system, three part-time research assistants were hired and trained. Two of the three research assistants held certification as Emergency Mobile Intensive Care Technicians, and the third was certified as an Emergency Medical Technician-Ambulance. In addition the backgrounds of each individual provided a basic understanding of the contents of most medical records. In order to further insure uniformity of scoring utilizing this system, a training program was held at the Kansas University Medical Center, under the direction of Norman E. McSwain, Jr., M.D., FACS. In addition to the initial training, Dr. McSwain was available at all times for individual consultation and in one case, Susan Baker, M.P.H. of John Hopkins University was consulted.

After the initial scoring sheets were completed in the field, the forms were attached to a copy of the accident report form and information compiled on a summary sheet (a copy is included in the appendix). In order to easily identify the victims of accidents as drivers or passengers, these sheets were also color coded. Upon completion of the accumulation of the data the information was transferred to the data processing section for input.

2.4 Roadside Helmet Survey

Because this study has been completed after the fact, it is impossible to accurately identify the use of motorcycle helmets during 1975 or 1976. Law enforcement officials in the state of Kansas had estimated compliance with the mandatory helmet law, prior to its repeal, at more than 95%. Unfortunately, there are no accurate statistics to confirm this figure. The credibility of this figure may be somewhat damaged by similar estimates following the repeal, which ranged from 20 to 35 per cent compliance, significantly lower than the actual observational survey indicated. In order to determine the actual use of motorcycle helmets during the same months of the study, during the year 1977, an observational survey of 2,000 motorcycle observations was carried out, during July, August, and September. A listing of the locations, the designations of rural or urban, the highway description, and the number of observations, is included in Table 2-5. A copy of the form which was used to record this information is also included in the appendix. Figures 2-6, 2-7 and 2-8 identify the exact locations of the surveys, as conducted. The research assistants who conducted the balance of the study were also utilized to complete the observational survey. Observation sheets were accumulated at the University of Kansas Medical Center, and were tabulated and analyzed.

2.5 Data Input

Upon completion of the data collection phase of the study, the raw data was transmitted to the Department of Information Systems, University of Kansas College of Health Sciences, for key punching. This operation was carried out in respect to the formats provided by DOT/NHTSA. A copy of this format is included in appendix "C". Because of the small numbers included in the roadside helmet survey, this information

TABLE 2-5

LOCATIONS AND DISTRIBUTION OF MOTORCYCLE OBSERVATIONS

RURAL SETTING

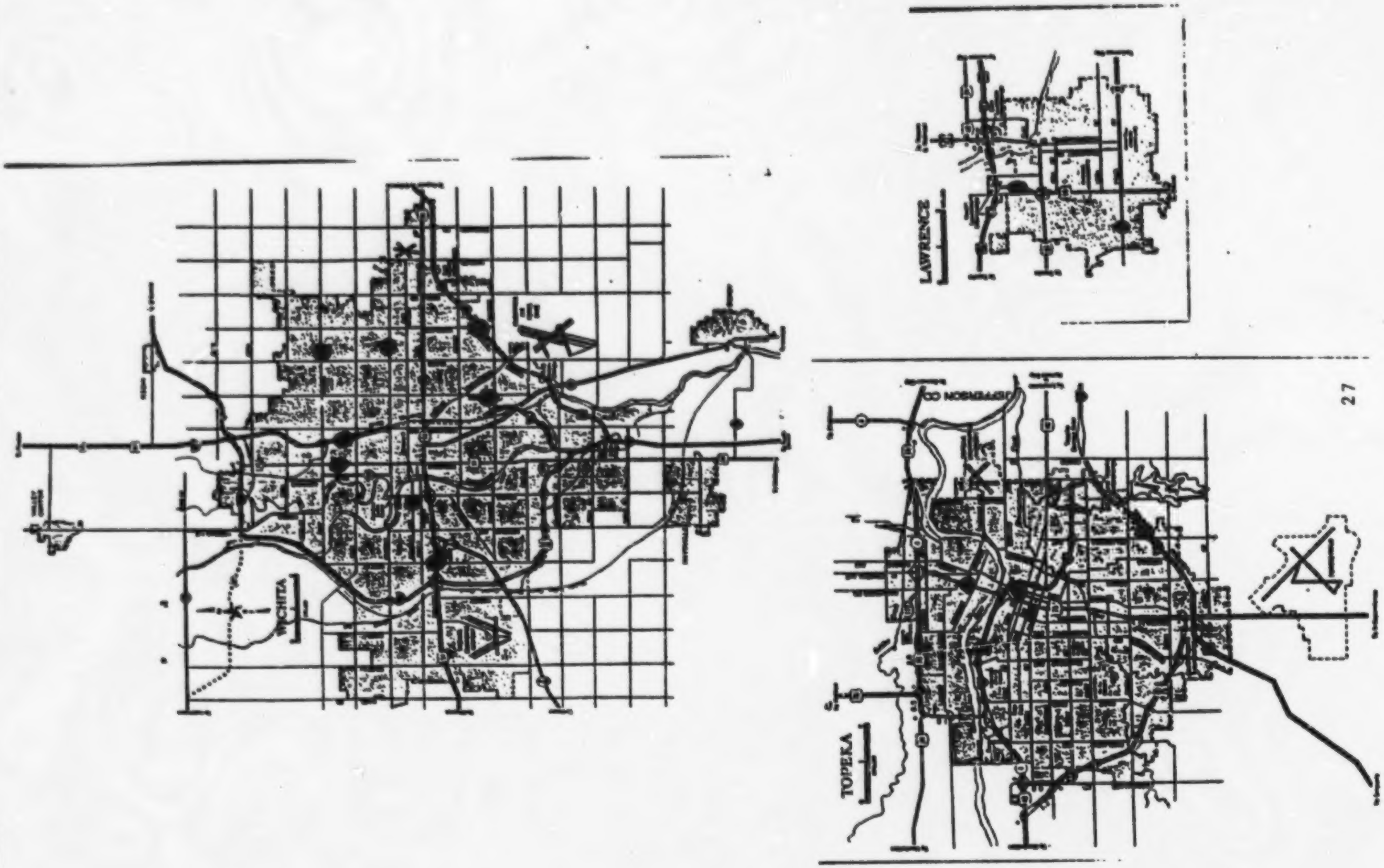
LOCATION	DESIGNATION	DESCRIPTION	# OF OBSERVATIONS	
			WEEKDAY	WEEKEND
West of Kansas City	U.S. # 24	2 lane highway	40	40
South Johnson Co.	U.S. # 69	2 lane highway	40	40
East of Topeka	U.S. # 40	2 lane highway	50	50
West of Kansas City	Ks. Turnpike	4 lanes with median	70	70
South of Topeka	Ks. # 75	4 lanes with median	25	25
West of Topeka	Interstate 70	4 lanes with median	75	75
East of Wichita	Ks. Turnpike	4 lanes with median	50	50
West of Wichita	U.S. # 54	2 lane highway	50	50
South of Wichita	Ks. # 15	2 lane highway	50	50
North of Wichita	Interstate 35W	4 lanes with median	50	50

URBAN SETTING

Overland Park	95th St.	4 lanes, no median	50	50
Kansas City	West State St.	2 lanes, no median	25	25
Kansas City	Interstate 635	4 lanes with median	25	25
Shawnee	Interstate 35E	4 lanes with median	25	25
Kansas City	7th. street	2 lanes, no median	25	25
Topeka	Ks. Turnpike	4 lanes with median	25	25
Topeka	N. Kansas Ave.	2 lanes, no median	25	25
North Topeka	N. Topeka Ave.	2 lanes, no median	25	25
Topeka	Interstate 70	4 lanes with median	25	25
Lawrence	N. Iowa	4 lanes, no median	25	25
Lawrence	W. 23rd.	2 lanes, no median	25	25
Wichita	N. Broadway	2 lanes, no median	25	25
Wichita	Interstate 35W	4 lanes with median	25	25
Wichita	W. Kellogg	4 lanes with median	25	25
Wichita	W. Douglas	2 lanes, no median	25	25
Wichita	S. Hillside	2 lanes, no median	25	25
Wichita	KS. Turnpike	4 lanes with median	25	25
Wichita	E. Central	4 lanes with median	25	25
Wichita	E. 21st. St.	2 lanes, no median	25	25

FIGURE 2-6

LOCATIONS OF MOTORCYCLE OBSERVATIONS IN TOPEKA, WICHITA AND LAWRENCE



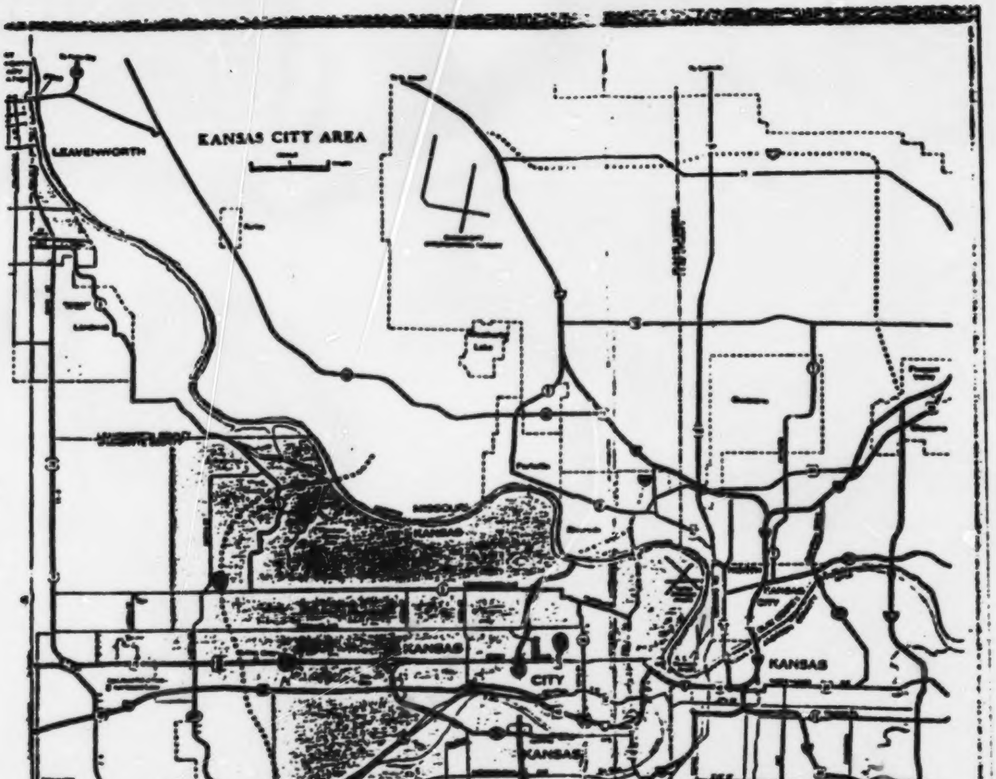
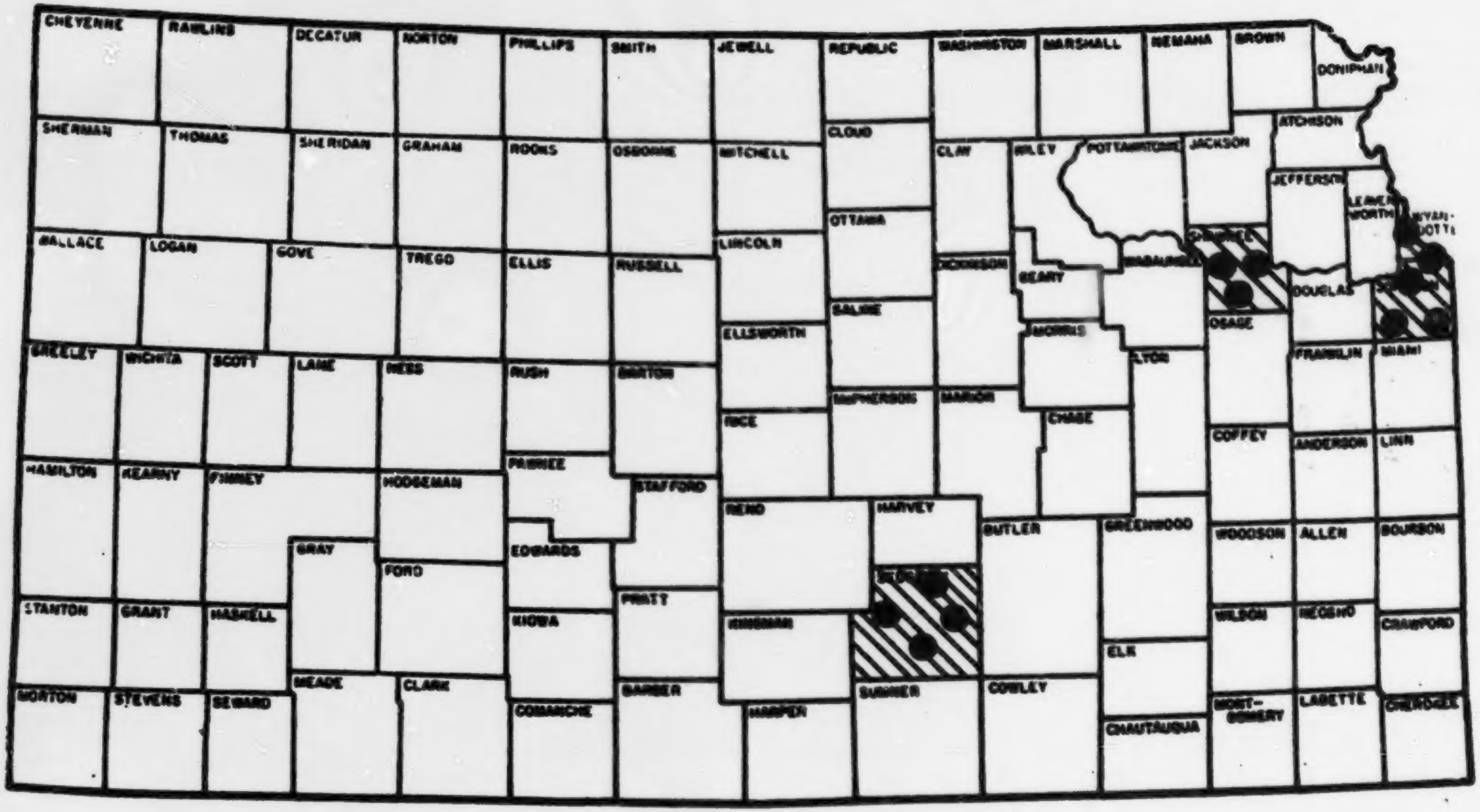


FIGURE 2-7

LOCATION OF MOTORCYCLE OBSERVATIONS WITHIN WYANDOTTE AND JOHNSON COUNTIES



MAP OF STUDY BOUNDARIES AND MOTORCYCLE OBSERVATIONS

FIGURE 2-8

was handled manually. After key punching and entry, all data analysis were performed by the Department of Biometry, School of Allied Health, University of Kansas College of Health Sciences, using a combination of the Biomedical Computer Program (BMDP), P-series and the Statistical Analysis System (SAS).

SECTION 3 STUDY RESULTS

3.1 Results of Roadside Survey

During July, August and September of 1977 a roadside survey was conducted in order to determine the number of motorcycle drivers and passengers who were utilizing head and/or eye protection. As stated earlier, because this was a retrospective study, it was impossible to ascertain the use of these protective devices prior to the repeal of the Kansas Mandatory Motorcycle Helmet Law. This survey was carried out at a variety of locations throughout the geographic boundaries of the study area on both weekdays and weekends. During this time two thousand and five motorcycles, two thousand and five drivers, and two hundred and fifty passengers were observed. The characteristics of this survey are illustrated in table 3-1. It will be noted that 90.3 percent of the total observed motorcycles were registered in the state of Kansas.

The motorcycles observed were equally split between rural and urban locations and also equally split according to weekend and weekday. During this roadside survey no observations were carried out on any official or state holidays. Table 3-2 illustrates the numbers and categories of observations during the roadside study.

3.1:1 Helmet Use and Rider Position

The use of motorcycle helmets and eye protection in the state of Kansas cannot be determined for any period prior to 1977. As a result the observational survey was actually conducted more than one year after the date of the repeal, and as a result, may reflect a stable period of helmet and eye protection use, that is consistant with the use of these devices throughout the state. Table 3-3 illustrates the results of the observational study relating to the use of helmets by both drivers and passengers in the geographic boundaries of the study area. On the basis of 2,255 total observations, 41.2 percent of the motorcycle passengers, observed were found to be wearing helmets. During the same period of time 47.8 percent of the motorcycle drivers were wearing helmets at the time of observation. The overall compliance rate during this period of time, therefore, was 47.1 percent for all

TABLE 3-1

GENERAL INFORMATION - ROADSIDE SURVEY

ROADSIDE HELMET SURVEY CHARACTERISTICS	POST-REPEAL PERIOD
Time Interval for Data Collection	July-September 1977
Total Number of Motorcycles Registered in Kansas	84,502
Total Number of Motorcycle Riders Observed During Survey	2,255
Total Motorcycles Observed	2,005
Number of Motorcycles Observed With Kansas Registration	1,811
Percent of Total	90.3%
Number of Motorcycles Observed With Out of State Registration	194
Percent of Total	9.7%

TABLE 3-2

NUMBER OF MOTORCYCLES OBSERVED

LOCATION	WEEKEND	WEEKDAY	TOTAL
RURAL	500	500	1000
URBAN	505	500	1005
COLUMN TOTAL	1005	1000	2005

TABLE 3-3

HELMET USE BY RIDER POSITION
ROADSIDE SURVEY

HELMET USE	RIDER POSITION		ROW TOTAL
	DRIVER	PASSENGER	
YES	958	103	1061
NO	1047	147	1194
COLUMN TOTAL	2005	250	2255
PERCENT WEARING HELMETS	47.8%	41.2%	47.1%

drivers and passengers on motorcycles.

3.1:2 Helmet Use By State of Motorcycle Registrations

During the observational study 1,811 of the 2,005 observed motorcycles were registered in the state of Kansas, a rate of 90.3 percent. The balance 194 motorcycles or 9.7 percent, were registered outside of the state of Kansas. The 194 motorcycles registered outside the state of Kansas held a total of 202 drivers and passengers. For this group, 46.0 percent were wearing helmets at the time of observation. 1,811 motorcycles registered in the state of Kansas were observed. There were 2,053 drivers and passengers on these motorcycles. 47.2 percent of those observed on Kansas registered motorcycles were wearing helmets at the time of observation. These figures are illustrated in table 3-4.

3.1:3 Helmet Use By Location

Table 3-5 illustrates the results of the observational study comparing the use of helmets in rural versus urban areas. 1,132 motorcycle drivers and passengers were observed on 1,000 motorcycles in rural areas. 48.3 percent of those were wearing helmets at the time of observation. 1,005 motorcycles were observed in an urban setting, with 1,123 total drivers and passengers. 45.8 percent of those observed in the urban setting were wearing helmets at the time of observation.

The observational study was completed in a variety of settings representative of the roadways within the geographic bounds of the study area. These may be broken down into three categories. Those roadways which were simply designated as two-lane were typical rural and urban streets and roads which carry a moderate degree of traffic at all times. The designation of four lanes was given to busy urban streets and rural highways that primarily serve as feeders into urban areas. In some cases these four-lane highways contain a median strip. The classification of interstate highway was made by selecting those highways designated to the interstate highway system. For the most part, the interstate highways of the study area are two lanes in each direction separated by a median strip. However, in busy urban areas as many as four lanes in each direction are found separated by a median strip. In each instance these are limited access

TABLE 3-4

HELMET USE BY STATE OF REGISTRATION ROADSIDE SURVEY

HELMET USE	OUT-OF-STATE REGISTRATIONS	KANSAS REGISTRATION	ROW TOTAL
YES	93	968	1061
NO	109	1085	1194
COLUMN TOTAL	202	2053	2255
PERCENT WEARING HELMET	46.0%	47.2%	47.1%

TABLE 3-5

HELMET USE BY URBAN OR RURAL LOCATION ROADSIDE SURVEY

HELMET USE	RURAL	URBAN	ROW TOTAL
YES	547	514	1061
NO	584	610	1194
COLUMN TOTAL	1132	1123	2255
PERCENT WEARING HELMET	48.3%	45.8%	47.1%

highways. It will be noted that helmet use ranges from a high of 48.7 percent on four lane highways in rural areas to a low of 44.3 percent on two lane urban streets. These statistics confirm opinions of Kansas law enforcement officers that helmet use was highest in rural areas and lowest on urban streets. For the most part, however, the use of motorcycle helmets was much higher than expected in urban areas and much lower than expected in rural areas. The use of helmets in all these settings is illustrated in table 3-6.

3.1:4 Use of Eye Protection By Drivers and Passengers of Motorcycles

The use of eye protection by drivers and passengers on motorcycles within the observational study is summarized in table 3-7. 70.2 percent of all drivers and passengers observed were wearing eye protection at the time of observation. 73 percent of drivers observed were wearing some form of eye protection, while only 48 percent of the observed passengers were wearing eye protection at the time of observation. Glasses were the most popular form of eye protection in use. 45.5 percent of those drivers observed were wearing glasses, while 26 percent of the passengers observed were wearing glasses. 43.3 percent of all drivers and passengers observed were wearing glasses at the time of observation. Goggles were the least popular form of eye protection, and were observed on 6.9 percent of the drivers of motorcycles while only 1 percent of the passengers used this device. Overall, 6.3 percent of all drivers and passengers observed were wearing goggles. The third category of eye protection, the use of visors, was observed in 20.6 percent of all drivers and passengers of motorcycles in this phase of the study. 20.5 percent of all observed drivers were using a visor, while 20.8 percent of all observed passengers were using this device.

3.2 Accident Characteristics

Table 3-8 illustrates the general characteristics of the motorcycle accidents included within the geographic boundaries and the time sequence of this study. In addition to this information, this table contains a general description of the numbers of accidents, the number of riders involved, the

TABLE 3-6

HELMET USE BY TYPE OF ROAD AND LOCATION ROADSIDE SURVEY

ROADWAY CLASSIFICATION	HELMET USE	LOCATION		ROW TOTAL
		RURAL	URBAN	
TWO-LANE	YES	214	218	432
	NO	231	273	504
	TOTAL	445	491	936
	PERCENT HELMET USE	48.0%	44.3%	46.2%
FOUR-LANE	YES	215	202	417
	NO	226	227	453
	TOTAL	441	429	870
	PERCENT HELMET USE	48.7%	47.1%	47.9%
INTERSTATE	YES	118	94	212
	NO	128	109	237
	TOTAL	246	203	449
	PERCENT HELMET USE	48.0%	46.3%	47.2%

TABLE 3-7

USE AND TYPE OF EYE PROTECTION BY RIDER POSITION
ROADSIDE SURVEY

RIDER POSITION	TYPE OF EYE PROTECTION				ROW TOTAL
	VISOR	GOGGLES	GLASSES	NONE	
DRIVER	412	139	912	542	2005
PASSENGER	52	3	65	130	250
TOTAL	464	142	977	672	2255
PERCENT	20.6%	6.3%	43.3%	29.8%	100.0%

TABLE 3-8

GENERAL ACCIDENT AND INJURY DATA

ACCIDENT AND INJURY STUDY CHARACTERISTICS	PRE-REPEAL PERIOD	POST-REPEAL PERIOD
TIME INTERVAL FOR DATA COLLECTION	July-September 1975	July-September 1976
GEOGRAPHICAL AREA COVERED	Johnson, Shawnee Sedgwick and Wyandotte Counties in Kansas	Johnson, Shawnee, Sedgwick, and Wyandotte Counties in Kansas
NUMBER OF ACCIDENTS:		
FATAL	6	8
NON-FATAL INJURY	121	159
NON-INJURY	223	210
	350	381
NUMBER OF RIDERS INVOLVED	410	470
NUMBER OF RIDERS MISSING HELMET DATA	57	75
NUMBER OF RIDERS WITH COMPLETE HELMET DATA	353	395
NUMBER OF FATALLY INJURED RIDERS	6	12
NUMBER OF NON-FATALLY INJURED RIDERS	143	201
NUMBER OF NON-INJURED RIDERS	261	257

number of riders for whom data is available, the incidence of fatal injuries, and the incidence of all injuries.

Table 3-8 indicates that there were 410 persons involved in motorcycle accidents during the 1975 (pre-repeal) section of this study. Complete helmet data was not available for 57 of these individuals. In addition, complete medical records were not available for six victims who were designated as injured in the study. As a result, 84.6 per cent of those identified were included in the final data.

During the 1976 (post-repeal) component of the study, 470 individuals were identified as drivers or riders of motorcycles involved in accidents. Complete helmet data for 75 individuals was not available, and in addition, medical records were not available for four victims who were identified as injured. As a result, complete information was available for 83.2 per cent of all individuals involved in motorcycle accidents during the 1976 portion of the study. For the entire study, complete helmet information, as well as complete medical information for those who were injured, was available for 83.9 per cent of all those who were identified as drivers or riders of motorcycles which were involved in accidents.

3.2:1 Age Characteristics of Motorcycle Riders

Table 3-9 contains a distribution of the ages of riders involved in accidents during the study, including helmet status. This table includes information for 84 per cent of all persons involved in motorcycle accidents during the two study periods.

Table 3-9 indicates that 40.8 per cent of those riders involved in accidents were age 20 or younger. This amounts to a total of 301 riders. 66.4 per cent of these riders, aged 20 years or less, were wearing helmets at the time of accident. Similar percentages of riders under the age of 10 years, and under the age of 5 years were wearing helmets at the time of accident.

3.2:2 Motorcycle Driving Experience

Table 3-10 illustrates the experience level of both

TABLE 3-9

HELMET USE BY AGE, PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

AGE GROUP (YEARS)	HELMET USED		HELMET NOT USED	
	NUMBER	PERCENT	NUMBER	PERCENT
1 - 5	2	0.40	1	0.40
6 - 10	2	0.40	1	0.40
11 - 15	28	5.65	10	4.05
16 - 20	168	33.87	89	36.03
21 - 25	150	30.24	77	31.17
26 - 30	60	12.10	36	14.57
31 -35	37	7.46	19	7.69
36 - 40	18	3.63	7	2.83
41 - 45	15	3.02	3	1.21
46 - 50	8	1.61	3	1.21
51 +	8	1.61	1	0.40
COLUMN TOTAL	496	100.00	247	100.00

TABLE 3-10

HELMET USE BY DRIVER EXPERIENCE
PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

DRIVER EXPERIENCE	HELMET USED		HELMET NOT USED	
	NUMBER	PERCENT	NUMBER	PERCENT
Less Than One Month	8	2.45	6	4.03
1 to 3 Months	2	.61	0	0.00
4 to 6 Months	5	1.53	0	0.00
7 Months to 1 Year	29	8.90	12	8.05
13 Months to 2 Years	30	9.20	12	8.05
25 Months to 4 Years	50	15.34	29	19.46
49 Months to 8 Years	95	29.14	49	32.89
More Than 8 Years	107	32.82	41	27.52
COLUMN TOTAL	326	100.0	149	100.0

the drivers of motorcycles, and the experience of the drivers who were accompanied by a passenger, while involved in an accident. As a result, some of the drivers may appear twice in the data.

Drivers with less than one month driving experience, or those passengers associated with drivers with less than one month's driving experience, account for 2.9% of all reported individuals. Of this group, 57.1% were wearing a helmet at the time of accident.

Drivers with less than one month driving experience, or those passengers associated with drivers with less than one month's driving experience, account for only 2.45 per cent of those involved in accidents while wearing a helmet, while motorcycle drivers and passengers with similar qualifications accounted for 4.03 per cent of those involved in motorcycle accidents without benefit of a helmet.

Among helmeted individuals involved in accidents, 77.3 per cent posessed, or were associated with a driver who posessed more than two years of driving experience. Among non-helmeted individuals, 79.9 per cent of the total posessed, or were associated with a driver who posessed more than two years experience.

3.2:3 Distribution by Speed Prior to Accident

Speed is an important consideration in any study concerned with accidents involving motorcycles. Tables 3-11 and 3-12 contain data concerning estimated speed at the time of crash for both helmeted and non-helmeted riders, and classifies injuries according to fatal, non-fatal and non-injury. Information concerning the speed prior to crash for 81 per cent of all accidents was available, however, estimated speed was available for only 28 per cent of the fatality accidents.

Comparison of table 3-11 and 3-12 does not point out any outstanding changes from the helmeted group to the group who were not wearing a helmet at the time of the accident.

TABLE 3-11

INJURY TO HELEMETED RIDERS, BY ESTIMATED PRE-CRASH SPEED
PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

INJURY LEVEL		SPEED (MILES PER HOUR)						ROW TOTAL
		0	1 - 15	16 - 30	31 - 45	46 - 60	61 +	
NO INJURY:	NUMBER	9	67	126	51	14	1	268
	PERCENT	3.36	25.00	47.01	10.03	5.22	0.37	100.00
NON-FATAL INJURY:	NUMBER	3	15	69	35	14	1	137
	PERCENT	2.19	10.95	50.36	25.55	10.22	0.73	100.00
FATAL INJURY:	NUMBER	0	0	0	2	1	0	3
	PERCENT	0.00	0.00	0.00	66.67	33.33	0.00	100.00
ALL RIDERS:	NUMBER	12	82	195	88	29	2	408
	PERCENT	2.74	20.10	47.79	21.57	7.11	0.49	100.00

TABLE 3-12

INJURY TO NON-HELMETED RIDERS, BY ESTIMATED PRE-CRASH SPEED PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

INJURY LEVEL		SPEED (MILES PER HOUR)						ROW TOTAL
		0	1 - 15	16 - 30	31 - 45	46 - 60	61 +	
NO INJURY:	NUMBER	2	16	49	27	7	0	101
	PERCENT	1.98	15.84	48.51	26.73	6.93	0.00	100.00
NON-FATAL INJURY:	NUMBER	0	11	37	21	10	0	79
	PERCENT	0.00	13.92	46.84	26.58	12.66	0.00	100.00
FATAL INJURY:	NUMBER	0	0	1	0	0	1	2
	PERCENT	0.00	0.00	50.00	0.00	0.00	50.00	100.00
ALL RIDERS:	NUMBER	2	27	87	48	17	1	182
	PERCENT	1.10	14.84	47.80	26.37	9.34	0.55	100.00

3.3 Non-Injury Accidents

Table 3-13 illustrates the number of individuals, with complete data, involved in non-injury accidents during the geographic boundaries and time periods of the study for 1975 and 1976. During the 1975 portion, 210 individuals, or 51 per cent of those involved in motorcycle accidents were involved in non-injury accidents. It will be noted that Table 3-13 indicates that all of these individuals were wearing a motorcycle helmet at the time of the accident. On first examination, this figure might be subject to skepticism, however, law enforcement officials in Kansas were extremely diligent in the pursuit of non-helmeted riders of motorcycles during this time period, issuing tickets in a very high percentage of cases. The absence of any non-helmeted drivers or riders from non-injury motorcycle accidents during the pre-repeal period of the study may simply reflect the availability of 210 motorcycle helmets to 210 individuals involved in 183 non-injury accidents. Because law enforcement officers were issuing tickets to those not wearing helmets at the time, it seems likely that these figures do not reflect the true helmet status of those involved in non-injury accidents at the time. It also is likely that any passengers who might have been involved in these non-injury accidents, who did not have a helmet available, may simply have left the scene prior to the arrival of a law enforcement officer, in order to avoid a citation.

During the 1976 (post-repeal) period, 201 individuals, involving some 43 per cent of all individuals involved in motorcycle accidents, were involved in non-injury accidents. 45 per cent of those involved in non-injury accidents were wearing helmets at the time of the accident. This figure consists of 48 per cent of the drivers of motorcycles involved in non-injury accidents, and 40 per cent of the passengers involved in the same accidents.

3.4 Injury Accidents

During the pre-repeal period of the study, 137

TABLE 3-13

NUMBER OF MOTORCYCLE RIDERS INVOLVED IN NON-INJURY ACCIDENTS PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

RIDER POSITION	NUMBER OF INDIVIDUAL RIDERS					
	PRE-REPEAL PERIOD			POST-REPEAL PERIOD		
	HELMET USE		TOTAL	HELMET USE		TOTAL
	YES	NO		YES	NO	
DRIVER	183	0	183	83	90	173
PASSENGER	27	0	27	8	20	28
TOTAL RIDERS	210	0	210	91	110	201

individuals were identified, with complete data, as victims or participants in injury accidents, including fatal accidents. During a similar time period following repeal of the motorcycle helmet law, 189 individuals were identified as victims or participants in injury accidents, including fatal accidents. During the pre-repeal period, 86 per cent of the drivers and passengers involved in all injury accidents, including fatal accidents, were wearing helmets. During the post-repeal period, 39 per cent of all drivers and passengers involved in injury accidents, including fatal accidents, were wearing helmets. For the entire study, 59 per cent of those involved in motorcycle accidents were wearing helmets at the time of accident. This information is summarized in Table 3-14.

Figure 3-15 graphically illustrates the change in the location of injuries suffered by those involved in motorcycle accidents in the pre-repeal period, 1975, and the post-repeal period, 1976. This table, which converts the distribution of injuries into rates, includes two categories of change that are statistically significant. Between 1975 and 1976, there was an increase in the incidence of general body injuries for those involved in motorcycle accidents, from 357 injuries per 1,000 individuals in 1975, to 463 injuries per 1,000 individauls in 1976, an increase of 29.7 per cent in the incidence of general body injuries. This increase is statistically significant ($X_2 = 8.45$ $p = .01$). The incidence of head injuries for those involved in motorcycle accidents, showed a 55.9 per cent increase, from 118 accidents per 1,000 persons involved in motorcycle accidents in 1975 to 184 injuries per 1,000 victims during 1976. This increase is also significant ($X_2 = 6.17$ $p = .01$).

The incidence of injuries to the neck decreased between 1975 and 1976, by some 11 per cent, from 23 injuries per 1,000 individuals involved in motorcycle accidents, to 20.5 injuries per 1,000 individuals during 1976. This change is not significant. In the other three body areas, chest, abdomen and extremities, increases in the incidence of trauma also occurred between 1975 and 1976, however, none of these increases are significant.

TABLE 3-14

INJURY CLASSIFICATION BY RIDER POSITION AND HELMET STATUS PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

INJURY SEVERITY	RIDER POSITION	PRE-REPEAL PERIOD			POST-REPEAL PERIOD		
		HELMET USE			HELMET USE		
		YES	NO	TOTAL	YES	NO	TOTAL
FATAL	DRIVER	6	0	6	2	7	9
	PASSENGER	0	0	0	0	3	3
	TOTAL	6	0	6	2	10	12
NON-FATAL INJURY	DRIVER	103	18	121	63	93	156
	PASSENGER	9	1	10	8	14	22
	TOTAL	112	19	131	71	107	178
NON-INJURY	DRIVER	183	0	183	83	90	173
	PASSENGER	27	0	27	8	20	28
	TOTAL	210	0	210	91	110	201
ALL SEVERITY LEVELS COMBINED	DRIVER	292	18	310	148	189	338
	PASSENGER	36	1	37	16	38	54
	TOTAL	328	19	347	164	227	392

FIGURE 3-15

DISTRIBUTION OF ALL INJURIES
(FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS)
1975 AND 1976

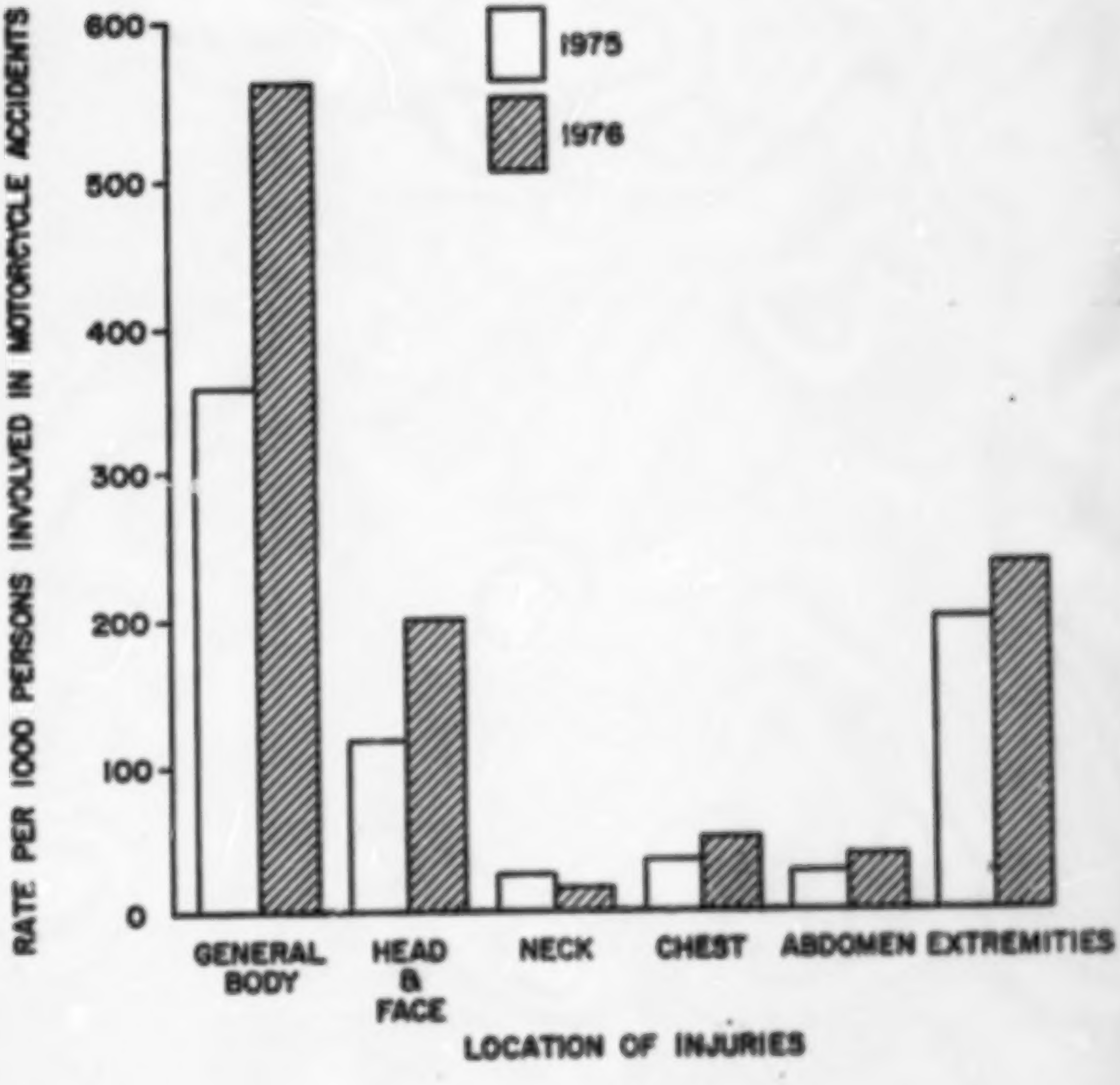


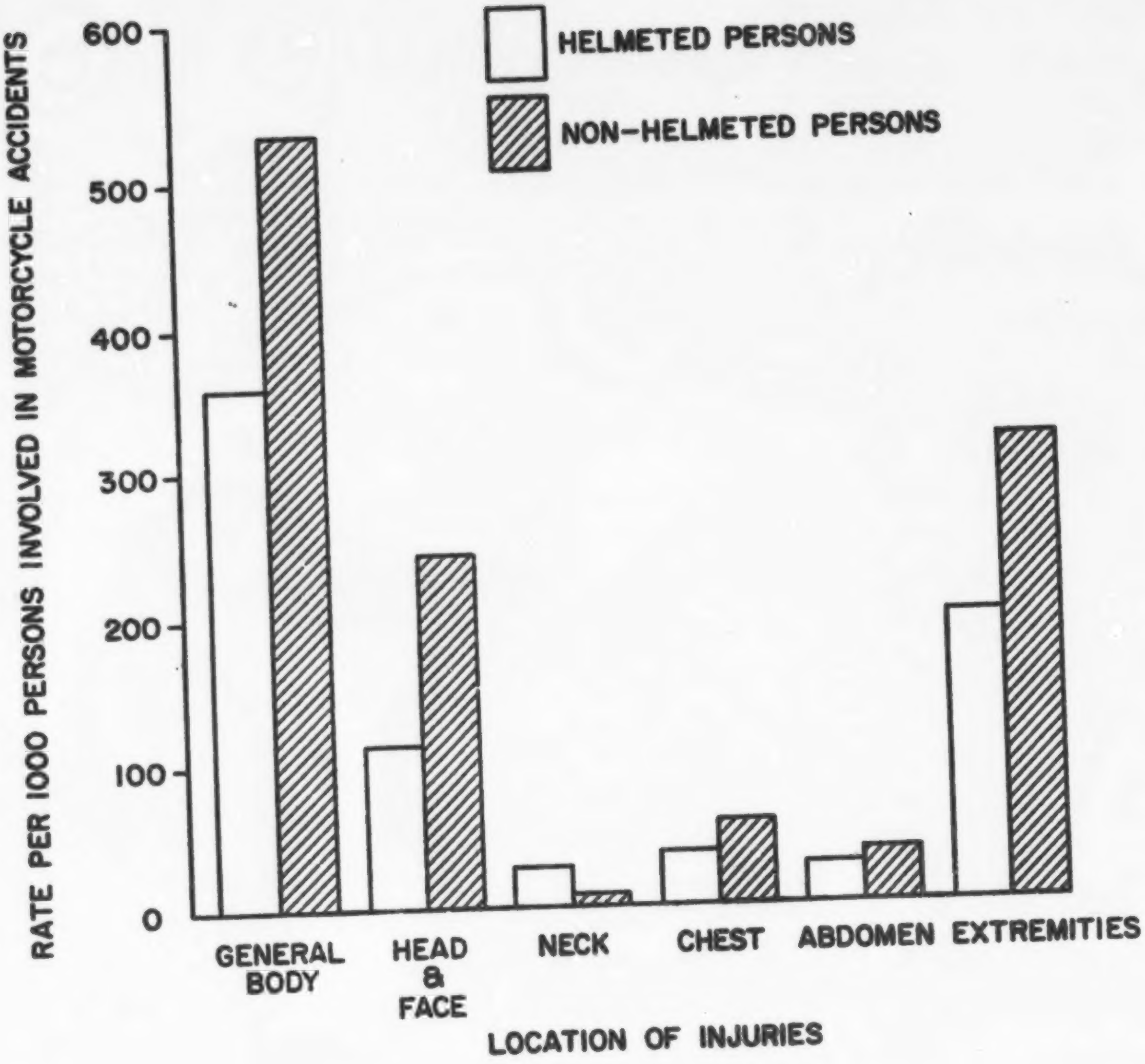
Figure 3-16 presents the same data as Figure 3-15, except that the two groups are divided into those persons injured while wearing a motorcycle helmet and those persons who were injured while no helmet was being worn. These figures include injuries in July, August and September of 1975 as well as injuries in July, August and September of 1976. There are similarities between these two Figures, but it will be particularly noted that the changes in general body injuries and head injuries are more pronounced when considered for helmeted vs. non-helmeted individuals than for the years of 1975 and 1976. The incidence of general body injury is 48.3 per cent greater for those involved in motorcycle accidents without the benefit of a helmet, than for those involved in similar accidents while wearing helmets. This difference is extremely significant ($X^2 = 20.19$, $p < .0001$). The respective rates are 356 injuries per thousand persons involved in accidents for the helmeted group, and 528 injuries per thousand in the non-helmeted group. The most striking change occurred in the category of head injury. The rate of head injury for those involved in motorcycle accidents while wearing helmets is 110 injuries per 1,000 persons involved in motorcycle accidents. The rate of injury for those not wearing helmets at the time of motorcycle accidents is 118 per cent greater, or 240 injuries per 1,000 persons involved in motorcycle accidents. This difference is extremely significant ($X^2 = 21.40$, $p < .0001$).

Examination of Figure 3-16 will also indicate a decrease in the incidence of neck injuries between the helmeted group and the non-helmeted group. The rate of neck injury for those wearing helmets at the time of motorcycle accidents was 26 neck injuries per 1,000 persons involved in motorcycle accidents. The rate of neck injury for those not wearing helmets at the time of accident is 54 per cent less, or 12 injuries per 1,000 persons involved in motorcycle accidents. This difference is not statistically significant ($X^2 = 2.76$, $p = .10$).

For each of the other three body areas, the rate of injury was higher for the non-helmeted group than for those wearing

FIGURE 3-16

DISTRIBUTION OF ALL INJURIES
(FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS)
HELMETED AND NON-HELMETED RIDERS



helmets at the time of accident. This is illustrated in Figure 3-16. The changes are not statistically significant.

Table 3-17 presents data concerning date, helmet status and the location of the first, second and third most severe injuries suffered by those injured by motorcycle accidents. This table does not consider the severity of the fourth, fifth and sixth most severely injured body areas. It must be pointed out that several victims included in this study suffered injury to more than three body areas. This information was limited by the DOT/NHTSA data format, and is not presented in this table. The data indicates an alteration in the distribution of total injuries, including an increase from 1975 to 1976 for the head category, and a decrease for the neck category. The decrease from 26.64 per cent for 1975 to 23.9 per cent for 1976, in the category of extremities indicates the high number of injuries to the extremities that were not among the three most severe body areas injured.

Table 3-18 illustrates similar data broken down by the AIS severity. This table considers only the first, second and third most severely injured body areas, which have been combined. This table indicates a slight increase in the incidence of AIS scores in category four and category five for the post-repeal period.

Tables 3-19 and 3-20 deal with the most severe injury suffered by each injured victim of motorcycle related accidents. These tables also indicate helmet status and the date. It will be noted from these tables, which only include the most severe injury, that there was a definite increase in the number of victims whose primary injury was to the head, between 1975 and 1976. It also will be noted that there was a definite increase, although slight, in the number of victims whose most severe injury scored higher in this category during 1976 than was demonstrated for 1975.

TABLE 3-17

DISTRIBUTION OF ALL INJURIES BY LOCATION AND HELMET STATUS (FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS) PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

LOCATION OF INJURY	NUMBER OF INJURY OCCURRENCES							
	PRE-REPEAL PERIOD				POST REPEAL PERIOD			
	HELMET USE		TOTAL INJURIES	PERCENT OF TOTAL INJURIES	HELMET USE		TOTAL INJURIES	PERCENT OF TOTAL INJURIES
	YES	NO			YES	NO		
Head & Face	36	5	41	15.83	18	54	72	18.65
Neck	5	0	8	3.09	5	3	8	2.08
Chest	11	0	11	4.25	6	13	19	4.92
Abdomen	6	0	6	2.32	6	8	14	3.63
Body	107	17	124	47.88	68	113	181	46.89
Extremities	59	10	69	26.64	37	55	92	23.83
Column Total	227	32	259	100.00	140	245	386	100.00

TABLE 3-18

DISTRIBUTION OF ALL INJURIES BY SEVERITY AND HELMET STATUS (FIRST, SECOND AND THIRD MOST SEVERLY INJURED BODY AREAS) PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

INJURY SEVERITY (AIS)	NUMBER OF INJURY OCCURRENCES							
	PRE-REPEAL PERIOD				POST-REPEAL PERIOD			
	HELMET USE		TOTAL INJURIES	PERCENT OF TOTAL INJURIES	HELMET USE		TOTAL INJURIES	PERCENT OF TOTAL INJURIES
	YES	NO			YES	NO		
1	113	18	131	53.91	83	135	218	58.44
2	56	10	66	27.16	25	63	88	23.59
3	29	4	33	13.58	21	20	41	10.99
4	7	0	7	2.88	4	9	13	3.49
5	6	0	6	2.47	2	11	13	3.49
6	0	0	0	0.00	0	0	0	0.00
COLUMN TOTAL	211	32	243	100.00	135	237	373	100.00
$\overline{X}$ SD	1.75 1.00	1.56 0.72	1.73 0.97		1.64 0.95	1.73 1.07	1.70 1.03	

TABLE 3-19

DISTRIBUTION OF MOST SEVERE INJURY LOCATIONS BY HELMET STATUS PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

MOST SEVERE INJURY LOCATION	NUMBER OF INDIVIDUAL RIDERS							
	PRE-REPEAL PERIOD				POST-REPEAL PERIOD			
	HELMET USE		TOTAL	PERCENT OF TOTAL	HELMET USE		TOTAL	PERCENT OF TOTAL
	YES	NO			YES	NO		
Head and Face	20	4	24	17.39	10	66	56	29.47
Neck	3	0	3	2.17	3	1	4	2.10
Chest	4	0	4	2.90	5	3	8	4.21
Abdomen	2	0	2	1.45	5	4	9	4.74
Body	43	7	50	36.23	21	34	55	28.95
Extremities	46	9	55	39.86	28	30	58	30.53
Column Total	118	20	138	100.00	72	118	190	100.00

TABLE 3-20

DISTRIBUTION OF MOST SEVERE INJURY LEVEL (AIS) BY HELMET USE PRE-REPEAL AND POST-REPEAL PERIODS

INJURY SEVERITY FOR MOST SEVERE INJURY (AIS)	NUMBER OF INDIVIDUAL RIDERS							
	PRE-REPEAL PERIOD				POST-REPEAL PERIOD			
	HELMET USE		TOTAL	PERCENT OF TOTAL	HELMET USE		TOTAL	PERCENT OF TOTAL
	YES	NO			YES	NO		
1	51	9	60	44.12	35	53	88	46.32
2	34	7	41	30.15	14	35	49	25.79
3	23	3	26	19.12	18	15	33	17.37
4	3	0	0	2.21	3	4	7	3.68
5	6	0	6	4.41	2	11	13	6.84
6	0	0	0	0.00	0	0	0	0.00
COLUMN TOTAL	117	19	136	100.00	72	118	190	100.00
$\bar{X}$ SD	1.97 1.10	1.68 0.75	1.93 1.06		1.93 1.08	2.03 1.25	1.99 1.19	

Table 3-21 contains information concerning those motorcycle drivers and passengers who were involved in non-fatal accidents that resulted in injury to at least one rider, by rider position, helmet status and time. This information is not included in this table. It will be noted that the percentage of passengers who were injured increased from 8 per cent in the pre-repeal period, to 14 per cent during the post-repeal period. If the same figures are compared by helmet status, we find that the percentage of injured passengers, who were wearing helmets at the time of accident, is 9 per cent, and the percentage of injured passengers who were not wearing helmets is 12 per cent.

Table 3-22 summarizes the total number of injuries, by location, helmet use and year. This information, because of the limitations of the data input format, does not include information concerning all injuries, since the data format only provides for recording the first, second and third most severe injuries. Information concerning injuries in the fourth, fifth and sixth most severely injured body areas is not included. Similar information is illustrated graphically in Figures 3-15 and 3-16.

The information presented in Table 3-22 is also included in Table 3-23, which summarizes the location of the three most severely injured body areas, by helmet use and by year. These tables illustrate the changes that occurred from the pre-repeal period to the post-repeal period, particularly regarding head injuries.

3.4:1 Injury and Severity Rates

Two separate tables are presented in this section. The first table concerns pre-repeal and post-repeal periods, and presents the distribution of injuries in the six body areas, on the basis of rates. The rates were developed by taking the score for a particular body area as numerator and utilizing the total identified persons for whom all data is complete for each period, as the denominator. This table provides the basis for the information already presented in Figure 3-15. As stated in an earlier section, the increase in the rate for general body injuries and the increase in the rate of head injuries are

TABLE 3-21

INJURY SEVERITY AND HELMET STATUS SUMMARY FOR ALL RIDERS INVOLVED IN INJURY ACCIDENTS PRE-REPEAL AND POST-REPEAL PERIODS

SEVERITY OF INJURIES SUSTAINED BY INDIVIDUALS	NUMBER OF INDIVIDUAL RIDERS					
	PRE-REPEAL PERIOD			POST-REPEAL PERIOD		
	HELMET USE		TOTAL	HELMET USE		TOTAL
	YES	NO		YES	NO	
INJURY						
PASSENGERS	9	1	10	8	14	22
DRIVERS	103	18	121	63	93	156
TOTAL RIDERS	112	19	131	71	107	178

TABLE 3-22

TOTAL NUMBER OF INJURIES AND SEVERITY FOR ALL RIDERS (FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS) PRE-REPEAL AND POST-REPEAL PERIODS

INJURY LOCATION	INJURY SEVERITY	NUMBER OF INJURY OCCURRENCES							
		PRE-REPEAL PERIOD				POST-REPEAL PERIOD			
		HELMET USE				HELMET USE			
		YES		NO		YES		NO	
		X	SD	X	SD	X	SD	X	SD
HEAD AND FACE	AIS = 1	21		3		12		26	
	2	6		1		1		13	
	3	2		1		2		3	
	4	2		0		1		2	
	5	2		0		1		10	
		1.73	1.21	1.60	0.89	1.71	1.26	2.20	1.53
NECK	AIS = 1	5		0		5		2	
	2	0		0		0		0	
	3	0		0		0		0	
	4	1		0		0		0	
	5	0		0		0		10	
		1.50	1.22	0.00	0.00	1.00	0.00	8.33	2.31
CHEST	AIS = 1	3		0		1		2	
	2	1		0		1		5	
	3	3		0		3		3	
	4	2		0		1		3	
	5	1		0		0		0	
		2.70	1.42	0.00	0.00	2.67	1.03	2.54	1.05
ABDOMEN	AIS = 1	2		0		2		1	
	2	0		0		0		1	
	3	0		0		0		3	
	4	1		0		2		3	
	5	2		0		1		0	
		3.20	2.05	0.00	0.00	3.00	1.87	3.00	1.07
GENERAL BODY	AIS = 1	66		12		55		87	
	2	32		5		10		18	
	3	1		0		0		0	
	4	0		0		0		0	
	5	1		0		0		0	
		1.38	0.62	1.29	0.47	1.15	0.36	1.17	0.38
EXTREMITIES	AIS = 1	16		3		8		17	
	2	17		4		13		26	
	3	23		3		16		11	
	4	1		0		0		1	
	5	0		0		0		0	
		2.16	0.86	2.00	0.82	2.22	0.79	1.93	0.77

TABLE 3-23

TOTAL NUMBER OF INJURIES SUSTAINED BY ALL RIDERS INVOLVED IN ACCIDENTS (FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS) PRE-REPEAL AND POST-REPEAL PERIODS

INJURY LOCATION	PRE-REPEAL PERIOD		POST-REPEAL PERIOD	
	HELMET USE		HELMET USE	
	YES	NO	YES	NO
HEAD AND FACE	36	5	18	54
NECK	8	0	5	3
CHEST	11	0	6	13
ABDOMEN	6	0	6	8
GENERAL BODY	107	17	68	113
EXTREMITIES	59	10	37	55
TOTAL OF ALL INJURIES SUSTAINED BY ALL RIDERS IN INJURY ACCIDENTS	227	32	140	246

TABLE 3-24

NUMBER AND RATE OF INJURIES TO RIDERS PER 1,000 ACCIDENTS (FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS) BY INJURY LOCATION, PRE-REPEAL AND POST-REPEAL PERIODS

INJURY LOCATION	PRE-REPEAL PERIOD		POST-REPEAL PERIOD	
	NUMBER	RATE	NUMBER	RATE
HEAD AND FACE	41	117.14	72	188.98
NECK	8	22.86	8	20.99
CHEST	11	31.43	19	49.87
ABDOMEN	6	17.14	14	36.75
EXTREMITIES	69	197.14	92	241.47
GENERAL BODY	124	354.29	181	475.07

significant. The decrease in the rate for neck injuries is not statistically significant, and the increases in the rate of injuries to the chest, abdomen and extremities are not significant.

Table 3-25 describes the rate of injury pertaining to the most severe injury sustained by each person involved in motorcycle accidents before and after the repeal of the Kansas Motorcycle Helmet law. This information presents a profile similar to that contained in Table 3-24. The nature of the data, however, does not make it possible to develop a statistical test for this data.

Table 3-26 presents the rate of total injury occurrances, for the first, second, and third most severe injury, combined. This data is divided according to helmet use and injury location and includes data for both year's combined. This data has already been presented in graphic form, in Table 3-16. As stated earlier, the increase in rate for head injuries and for injuries to the general body are extremely significant. The decrease in the rate of injuries to the neck is not significant, and the increase in the rate of injury to the chest, abdomen and extremities are not significant.

Table 3-27 is similar to Table 3-26 except that Table 3-27 considers only the location of the victim's most severe injury, once again divided into helmet use and non-use groups. Comparing the data in these two tables brings out a point of some significance. The statistics indicate that not only do helmetless riders have a higher rate of head injury, but the head injury is often their most serious injury. In point of fact, for those individuals studied, helmetless riders that suffered trauma to the head were found to have head injuries as their most severe injury 233.4% more often than riders protected by helmets.

TABLE 3-25

NUMBER OF MOST SEVERE INJURY LOCATIONS AND RATE PER 1,000 ACCIDENTS PRE-REPEAL AND POST-REPEAL PERIODS

INJURY LOCATION	PRE-REPEAL PERIOD		POST-REPEAL PERIOD	
	NUMBER	RATE	NUMBER	RATE
HEAD AND FACE	23	65.71	56	146.98
NECK	3	8.57	4	10.50
CHEST	4	11.43	8	21.00
ABDOMEN	2	5.71	9	23.62
EXTREMITIES	55	157.14	58	152.23
GENERAL BODY	49	140.00	55	144.36

TABLE 3-26

NUMBER OF ALL INJURIES AND RATE OF INJURY PER 1,000 ACCIDENTS (FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS) BY INJURY LOCATION AND HELMET STATUS BOTH YEARS COMBINED

INJURY LOCATION	HELMET USE			
	YES		NO	
	NUMBER	RATE	NUMBER	RATE
HEAD AND FACE	54	109.76	59	239.84
NECK	13	26.42	3	12.20
CHEST	17	34.55	13	52.85
ABDOMEN	12	24.39	8	32.52
EXTREMITIES	96	195.12	65	264.23
GENERAL BODY	175	355.69	130	528.46

TABLE 3-27

NUMBERS OF MOST SEVERELY INJURED BODY AREAS, AND RATE PER 1,000 RIDERS, BY INJURY LOCATION AND HELMET STATUS

INJURY LOCATION	HELMET USE			
	YES		NO	
	NUMBER	RATE	NUMBER	RATE
HEAD AND FACE	30	60.97	50	203.25
NECK	6	12.20	1	4.07
CHEST	9	18.29	3	12.20
ABDOMEN	7	14.23	4	16.26
EXTREMITIES	74	150.41	39	158.54
GENERAL BODY	65	132.11	40	162.60

3.5 Statistical Tests

Throughout this section, the CHI-SQUARE statistical test has been utilized to determine the significance of changes in rates and the distribution of data collected in this study. Because this study was done on a retrospective basis, it was not possible to do any tests of significance for information involving motorcycle helmet use as observed in a pre-repeal period. As a result no tests of significance have been applied to the observational study of motorcycle helmet usage. In a similar vein, it has not been possible to compare the use of the motorcycle helmets by those involved in motorcycle accidents with any observational study.

The nature of the data gathered in this study also presents a difficult problem when dealing with the CHI-SQUARE test. This difficulty is illustrated by Table 3-28, which illustrates a distribution of all injuries for which data was gathered, by location in an identified body area. This data indicates that during the pre-repeal period, 15.8% of all of the injuries gathered were head injuries. During the post-repeal period, 18.7% of all injuries observed were head injuries. There are two factors that prevent a CHI-SQUARE test from being used for this Table, as well as any other meaningful statistical test.

1. This data considers only the first, second and third most severely injured body areas. In many instances victims may well have suffered injuries to each body area, and as a result there are numerous omissions from this Table.
2. Because the first, second and third most severely injured body areas are considered, each subject may well have more than one entry in this Table. As a result a CHI-SQUARE test cannot be done, since it requires a maximum of one entry per subject.

Despite this handicap, the accumulation of data in Table 3-28 may well be meaningful. The data distribution follows the same pattern

TABLE 3-28

DISTRIBUTION OF ALL INJURIES BY BODY AREA (FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS) COMPARED FOR PRE-REPEAL AND POST-REPEAL PERIODS

INJURY LOCATION	PRE-REPEAL PERIOD	POST-REPEAL PERIOD	ROW TOTAL
HEAD AND FACE	41	72	113
NECK	8	8	1
CHEST	11	19	30
ABDOMEN	6	14	20
GENERAL BODY	124	181	305
EXTREMITIES	69	92	161
TOTAL OF ALL INJURIES: FATAL AND NON-FATAL	259	386	645

as other tables in the study, in the area of the neck, where a lower percentage of neck injuries is reported in the post-repeal period than in the pre-repeal period. In the other categories, the pattern is not similar, as a more uniform percentage of total injuries was recorded.

Table 3-29 is similar to Table 3-28, with the exception that Table 3-29 deals with a distribution of most severe injuries. Because each subject can sustain only one "most severe injury", it is possible to do a Chi-square analysis on Table 3-29. This table is significant ($X^2 = 11.510$, $p = .0412$). Data in this table indicates a change in distribution of injuries to all areas of the body between the pre-repeal and the post-repeal period. There is an increase in the distribution of head injuries from 17.5% of the total injuries in the pre-repeal period to 29.0% of the total injuries in the post-repeal period. As in other tables there is a decrease in the distribution of neck injuries from 2.2% of the total injuries in the pre-repeal period to 2.1% of the total injuries in the post-repeal period.

Table 3-30 contains data concerning the distribution of most severe injury occurances by location, for those injured while using helmets, compared with those injured without benefit of helmets. Because this table considers "most severe injury" a Chi-Square test has been applied.

The distribution of data in Table 3-30 indicates that 15.7% of the helmeted drivers involved in motorcycle accidents suffered an injury to the head, and in each case this was the most severe injury suffered by that victim. Similar data for the group wearing helmets at the time of accident indicates that 36.8% of those not using a helmet at the time of accident suffered their most severe body injury in the area of the head. Totals from this table indicate that 24.5% of those injured in motorcycle accidents in the entire study suffered their maximum injury in the vicinity of the head. The data contained in this table also indicates that six people suffered their maximum injury to the neck area.

TABLE 3-29

DISTRIBUTION OF MOST SEVERE INJURY LOCATIONS BY INJURY LOCATION COMPARED FOR PRE-REPEAL VS. POST-REPEAL PERIOD (CHI-SQUARE TEST)

INJURY LOCATION	PRE-REPEAL PERIOD	POST-REPEAL PERIOD	ROW TOTAL
HEAD AND FACE	24	56	80
NECK	3	4	7
CHEST	4	9	13
ABDOMEN	2	10	12
GENERAL BODY	49	57	106
EXTREMITIES	55	58	113
TOTAL MOST SEVERE INJURIES	137	194	331
X^2 (5) = 11.405; P= 0.0439			

TABLE 3-30

DISTRIBUTION OF MOST SEVERE INJURY LOCATIONS, BY INJURY LOCATION, COMPARED FOR HELMET USE OR NON-USE PRE-REPEAL AND POST-REPEAL PERIODS COMBINED (CHI-SQUARE TEST)

INJURY LOCATION	HELMET USE		ROW TOTAL
	YES	NO	
HEAD AND FACE	30	50	80
NECK	6	1	7
CHEST	9	3	12
ABDOMEN	7	4	11
GENERAL BODY	65	40	105
EXTREMITIES	74	39	113
TOTAL MOST SEVERE INJURIES	191	137	328

$X^2(5) = 20.86$ $P = .0009$

1% of the persons involved in motorcycle accidents without helmet protection suffered their maximum injury to the neck area. This information warrants further consideration, as does the difference between the rates for head injury for the helmeted and non-helmeted group. Both of these considerations will be discussed at greater length in section 3-6.

The difference between head injuries suffered by the helmeted group and the non-helmeted group is partially explained by the change in percentage of injuries to the general body and extremities. It will be noted that 72.7% of all persons injured in motorcycle accidents who were wearing a helmet, in the course of this study, received their maximum injury to the extremities or general body. Only 58.1% of those injured in motorcycle accidents while riding a motorcycle without the benefit of a helmet, received their maximum injury in the body areas designated as general body and extremities. This difference, which amounts to 14.6% between the two groups, for extremities and general body, partially accounts for the difference in head injuries between the helmeted and non-helmeted group, or some 19.1%. This does not represent a percent of increase or decrease, it simply represents a difference between the distribution of injuries. The figures contained in Table 3-30 are extremely significant (X^2 (5) = 20.86 p = .0009).

3.6 Injuries to the Head and Neck

Table 3-31 illustrates the numbers of total injuries to the head and neck for all persons involved in motorcycle accidents in the geographic bounds and time periods of this study. These numbers have also been converted into rates based on injuries per one thousand subjects. This table consists of data that considers only the first, second and third most severely injured body areas. One of the interesting features of this Table is that all rates of injury for all AIS severity levels increased during the post repeal period except AIS level 4 for neck injuries. Only one AIS level 4 injury occurred, and it was recorded during the pre-repeal period. This injury was not an orthopedic injury, but rather, was a deep laceration. When the two injury locations are combined, this same pattern holds, since it will be noted all AIS levels except level 4 recorded higher rates during the post-repeal period than during the pre-repeal period.

TABLE 3-31

NUMBER OF INJURIES TO RIDER'S HEAD AND NECK, AND RATE PER 1,000 ACCIDENTS, PRE-REPEAL AND POST-REPEAL PERIODS

INJURY LOCATION	INJURY SEVERITY	PRE-REPEAL PERIOD		POST-REPEAL PERIOD	
		NUMBER	RATE	NUMBER	RATE
		X SD		X SD	
HEAD AND FACE	AIS = 1	24	68.57	38	99.74
	2	7	20.00	14	36.75
	3	3	8.57	5	13.12
	4	2	5.71	3	7.87
	5	2	5.71	11	28.87
	6	0	0.00	0	0.00
		1.71 1.16		2.08 1.48	
NECK	AIS = 1	5	14.29	7	18.37
	2	0	0.00	0	0.00
	3	0	0.00	0	0.00
	4	1	2.86	0	0.00
	5	0	0.00	1	2.63
	6	0	0.00	0	0.00
		1.50 1.22		1.50 1.41	
TOTAL FOR HEAD AND NECK INJURIES	AIS = 1	29	82.86	45	118.11
	2	7	20.00	14	36.75
	3	3	8.57	5	13.12
	4	3	8.57	3	7.87
	5	2	5.71	1	
	6	0	0.00	0	0.00

Table 3-32 contains similar data but in this case, it is divided between helmet use and non-use. It will be noted that all AIS severity levels for the head show an increase between the helmeted group and the non-helmeted group. It is particularly important that the incidence of AIS level 5 injuries to the head are 566% greater for those not wearing a helmet at the time of injury than for those wearing a helmet at the time of injury.

Figure 3-33 graphically illustrates the per cent distribution of total head injuries throughout the study. This figure is divided between helmeted persons and non-helmeted persons. Figure 3-33 indicates that a high percentage, 66%, of all helmeted drivers suffered relatively minor injuries to the head, at AIS level 1. A relatively low percentage of those suffering head injuries while wearing helmets suffered injuries at AIS level 5, only 6% of the total. Similar figures for the group injured with the benefit of a motorcycle helmet indicate that 49% of those injured with the benefit of helmet protection suffered injuries at the AIS 1 level, while 17% of the total who received head injuries without the benefit of helmet protection scored at AIS level 5. The information contained in this figure consists of fairly small numbers. The information is not statistically significant. The information in Figure 3-33 is also contained in Table 3-34.

In addition to this information concerning head injuries, attention should also be given to the topic of neck injuries. There has been a great deal of speculation that the use of motorcycle helmets might actually increase the incidence of neck trauma because of the weight of the motorcycle helmet. The information concerning trauma is limited, however, Table 3-32 indicates that AIS level 4 injuries occurred at the rate of 2.03 injuries/1000 persons involved in motorcycle accidents while wearing helmets. The same table also indicates that a rate of 4.07 neck injuries/1000 persons involved in motorcycle accidents without helmets, occurred at AIS level 5. The number of persons involved in these figures is quite small, with only one helmeted and one non-helmeted person scored higher than AIS level one for any neck injury.

TABLE 3-32

NUMBER OF ALL INJURIES TO THE HEAD AND NECK AND RATE PER 1,000 RIDERS, FOR FATALLY AND NON-FATALLY INJURED RIDERS

INJURY LOCATION	INJURY SEVERITY	HELMET USE			
		YES		NO	
		NUMBER	RATE	NUMBER	RATE
		X SD		X SD	
HEAD AND FACE	AIS = 1	33	67.07	29	117.89
	2	7	14.23	14	56.91
	3	4	8.13	4	16.26
	4	3	6.10	2	8.13
	5	3	6.10	10	40.65
	6	0	0.00	0	0.00
		1.72 1.21		2.15 1.49	
NECK	AIS = 1	1	20.33	2	8.13
	2	0	0.00	0	0.00
	3	0	0.00	0	0.00
	4	1	2.03	0	0.00
	5	0	0.00	1	4.07
	6	0	0.00	0	0.00
		1.27 0.90		2.33 2.31	
TOTAL FOR HEAD AND NECK INJURIES	AIS = 1	43	87.40	31	126.02
	2	7	14.23	14	56.91
	3	4	8.13	4	16.26
	4	4	8.13	2	8.13
	5	3	6.10	11	44.72
	6	0	0.00	0	0.00
		1.64 1.17		2.16 1.52	

FIGURE 3-33

DISTRIBUTION OF SEVERITY LEVELS FOR ALL HEAD INJURIES
(FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS)
HELMETED VS. NON-HELMETED RIDERS

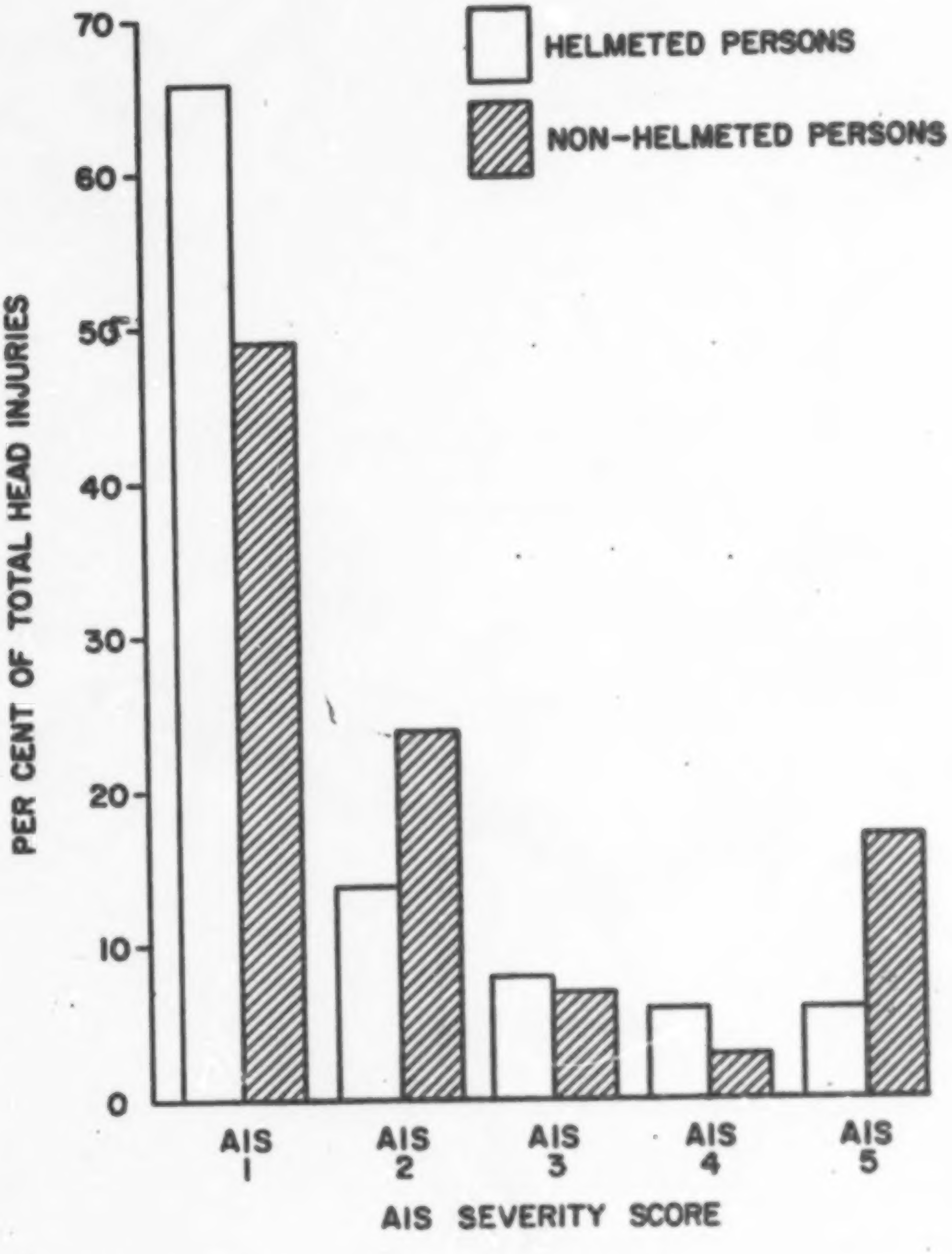


TABLE 3-34

DISTRIBUTION OF ALL INJURIES TO THE HEAD, BY SEVERITY (FIRST, SECOND AND THIRD MOST SEVERELY INJURED BODY AREAS) COMPARED FOR HELMET STATUS, PRE-REPEAL AND POST-REPEAL PERIODS COMBINED

INJURY SEVERITY LEVEL (AIS)	HELMET USE		ROW TOTAL
	YES	NO	
1	33	29	62
2	7	14	21
3	4	4	8
4,5	6	12	18
6	0	0	0
TOTAL OF ALL INJURIES SUSTAINED BY THE HEAD	50	59	109
X SD	1.72 1.20	2.08 1.36	1.92 1.30

$X^2(3) = 3.8747$; $P = .2753$

Note: AIS 4 and 5 Combined Due to Low Frequency

None of the statistics concerning neck trauma are significant. It must be noted that no injured victim during the course of this study suffered any fracture or other orthopedic trauma to the cervical spine. Only 16 of the subjects who were involved in motorcycle accidents during the course of this study received injury to the body area designated as neck. Fourteen of those victims suffered an injury at AIS level 1. One helmeted victim suffered an injury at AIS level 4, one non-helmeted person suffered an AIS level 5 injury. Specific examination of the injuries suffered by these victims, who were also fatalities indicates that the helmeted victim suffered second and third degree burns over the entire body surface, resulting in the AIS score of 4 to the neck, while the non-helmeted person suffered a deep laceration of both carotids and the esophagus, scored as AIS level 5. In these cases, helmet use or non-use did not appear to effect the mechanics of injury.

3.7 Fatality Accidents

Table 3-35 illustrates the number of total motorcycle riders who were involved in fatality accidents during the pre-repeal period and the post-repeal period. During the pre-repeal period there were six fatal accidents, involving six fatally injured drivers and one non-injured passenger. During the pre-repeal period there were eight fatal accidents, involving eight fatally injured drivers and three fatally injured passengers. During the post-repeal all persons involved in fatal motorcycle accidents were wearing a helmet at the time of accident. During the post-repeal period, one fatally injured driver was wearing helmet, while three fatally injured passengers and seven fatally injured drivers were not wearing a helmet at the time of accident. Out of the seventeen total fatalities, three of the fatalities were passengers while fourteen were drivers. Seven of the fatally injured persons were wearing helmets at the time of accident, while ten were not wearing helmets.

Table 3.36 illustrates the total number of injuries suffered in fatal accidents and their severity and location, for the pre-repeal and post-repeal periods. This table represents the location and severity of the first, second and third most severely injured body area. It does not present information concerning the fourth, fifth, or sixth most severely injured body area. In many cases the fatalities suffered injuries to all body areas. It will be noted that no AIS

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TABLE 3-35

INJURY SEVERITY AND HELMET USE SUMMARY FOR ALL RIDERS INVOLVED IN FATAL ACCIDENTS, PRE-REPEAL AND POST-REPEAL PERIODS

SEVERITY OF INJURIES SUSTAINED BY INDIVIDUALS	NUMBER OF INDIVIDUAL RIDERS					
	PRE-REPEAL PERIOD			POST-REPEAL PERIOD		
	HELMET USE		TOTAL	HELMET USE		TOTAL
	YES	NO		YES	NO	
FATALITY						
PASSENGERS	0	0	0	0	3	3
DRIVERS	6	0	6	1	7	8
TOTAL RIDERS	6	0	6	1	10	11
INJURY						
PASSENGERS	0	0	0	0	0	0
DRIVERS	0	0	0	0	1	1
TOTAL RIDERS	0	0	0	0		
NON INJURY						
PASSENGERS	1	0	1		0	0
DRIVERS	0	0	0	0	0	0
TOTAL RIDERS	1	0	1	0	0	0
TOTAL RIDERS INVOLVED IN FATAL ACCIDENTS	7	0	7	1	11	12

TABLE 3-36

TOTAL NUMBER OF INJURIES AND SEVERITY FOR ALL RIDERS INVOLVED IN FATAL ACCIDENTS PRE-REPEAL AND POST-REPEAL PERIODS

INJURY LOCATION	INJURY SEVERITY	NUMBER OF INJURY OCCURRENCES							
		PRE-REPEAL PERIOD				POST-REPEAL PERIOD			
		HELMET USE				HELMET USE			
		YES		NO		YES		NO	
		X	SD	X	SD	X	SD	X	SD
HEAD	AIS = 1	0		0		0		0	
	2	0		0		0		0	
	3	0		0		0		0	
	4	1		0		0		0	
	5	2		0		1		10	
	6	0		0		0		0	
		4.67	0.58	0.00	0.00	5.00	0.00	5.00	0.00
NECK	AIS = 1	0		0		0		0	
	2	0		0		0		0	
	3	0		0		0		0	
	4	1		0		0		0	
	5	0		0		0		1	
	6	0		0		0		0	
		4.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
CHEST	AIS = 1	0		0		0		1	
	2	0		0		0		2	
	3	1		0		0		2	
	4	2		0		1		2	
	5	1		0		0		0	
	6	0		0		0		0	
		4.00	0.82	0.00	0.00	4.00	0.00	2.71	1.11
ABDOMEN	AIS = 1	0		0		0		0	
	2	0		0		0		0	
	3	0		0		0		1	
	4	1		0		0		1	
	5	1		0		1		0	
	6	0		0		0		0	
		4.50	0.71	0.00	0.00	5.00	0.00	3.50	0.71
GENERAL BODY	AIS = 1	0		0		0		1	
	2	3		0		1		3	
	3	0		0		0		0	
	4	0		0		0		0	
	5	1		0		0		0	
	6	0		0		0		0	
		2.75	1.50	0.00	0.00	2.00	0.00	1.75	0.50
EXTREMITIES	AIS = 1	0		0		0		0	
	2	1		0		0		4	
	3	3		0		2		2	
	4	0		0		0		1	
	5	0		0		0		0	
	6	0		0		0		0	
		2.75	0.50	0.00	0.00	3.00	0.00	2.57	0.79

injuries at that level actually occur. This experience was confirmed through consultation with other investigators who have used the AIS system. It should be noted that both entries in the injury location for neck were soft tissue injuries, as discussed in section 3.6. Table 3-37 contains a summary by location of all injuries suffered by those fatally injured in motorcycle accidents. The most striking difference occurs in the area of head trauma where sixteen percent of those wearing helmets while fatally injured suffered some injury to the head, while 33 percent of those not wearing helmets suffered trauma to the head.

In summary, during the 1975 portion of the study, there were six fatalities among 347 total persons involved in motorcycle accidents. This results in a crude death rate of 17.3 fatalities per one thousand persons involved in motorcycle accidents. During 1976, there were 11 fatalities out of 391 persons involved in motorcycle accidents, for a crude death rate of 28.1 fatalities per one thousand persons. This increase of 62.7 percent in the crude death rate between 1975 and 1976 is not significant ($X^2 = 0.96$ $p = .33$).

When these fatalities are classified according to helmet use or non-use, there was also an increase in the crude death rate between groups. Seven helmeted persons were fatally injured out of 492 persons wearing helmets at the time of accident, for a crude death rate of 14.3 fatalities per one thousand helmeted persons involved in motorcycle accidents. Ten persons without the benefit of a helmet were fatally injured, out of a total of 246 persons who were involved in motorcycle accidents without a helmet, resulting in a crude death rate of 40.7 per one thousand people involved in motorcycle accidents, which is 185 percent greater than the crude death rate for persons involved in accidents while wearing a helmet. This difference is significant ($X^2 = 5.09$ $p = .029$).

3.8 Helmet Damage Related To Non-Injured Riders

During this review of motorcycle accident report forms 39 cases were discovered where the person involved in a motorcycle accident reported damage to his motorcycle helmet but did not report any head injury. If this figure is combined with the

TABLE 3-37

TOTAL NUMBER OF INJURIES SUSTAINED BY ALL RIDERS INVOLVED IN FATAL ACCIDENTS PRE-REPEAL AND POST-REPEAL PERIODS

INJURY LOCATION	PRE-REPEAL PERIOD HELMET USE		POST-REPEAL PERIOD HELMET USE	
	YES	NO	YES	NO
HEAD AND FACE	3	0	1	10
NECK	1	0	0	1
CHEST	5	0	1	7
ABDOMEN	2	0	1	2
GENERAL BODY	4	0	1	4
EXTREMITIES	4	0	2	7
TOTAL OF ALL INJURIES SUSTAINED BY ALL RIDERS IN FATAL ACCIDENTS	19	0	6	31

number of individuals who suffered head injury while wearing the helmet, a combined rate of 222 events per one thousand motorcycle accident results, this compares with the rate of head injury to non-helmeted persons of 240 injuries per one thousand persons involved in motorcycle accidents. If each of the individuals who reported a damaged helmet had instead suffered a head injury of AIS level 1 these rates would be almost identical. This provides evidence that in at least 39 cases the motorcycle helmet prevented injury to the head.

SECTION 4 CONCLUSIONS

The following conclusions are based upon data recorded in specific study areas within the geographic boundaries of the state of Kansas during the months of July, August and September of both 1975 and 1976. The conclusions are based on the data as described in section 3.

Section 4.1 Road Side Helmet Survey

A. Because this was a retrospective study, it was not possible to determine the usage of motorcycle helmets in the state of Kansas prior to the repeal of the mandatory motorcycle helmet law. The use of helmets in the state of Kansas had been estimated at 97 percent by state law enforcement officers.

B. During the months of July, August, and September, 1977, two thousand observations of motorcycles were carried out within the geographic boundaries of the study. During this time, 47.1 percent of all observed riders were wearing motorcycle helmets at the time of observation. 48.3 percent of the observed motorcycle riders in rural locations were wearing helmets, while 45.8 percent of those observed riding motorcycles in urban locations were wearing helmets.

C. When observations were classified according to road type, 46.2 percent of all motorcycle riders observed on two lane highways in all locations were observed to be wearing motorcycle helmets. 47.9 percent of those observed in four lane highways in all locations were observed to be wearing helmets, while 47.2 percent of all those observed riding motorcycles on interstate highways at all locations were wearing helmets.

4.2 Injury Location and Severity Evaluation

Utilizing the Abbreviated Injury Scale, evaluations were made of all motorcycle riders who were injured in motorcycle accidents within the geographic boundaries and the time frames of this study. The following conclusions result from the data gathered, as outlined in section 3.

A. During 1975, the observed rate of head injuries for those involved in motorcycle accidents was 118 injuries per one thousand persons involved in motorcycle accidents. During 1976 the observed rate of head injuries for those involved in motorcycle accidents was 184 injuries per one thousand persons. This represents an increase of 56.6 percent in the incidence of head injuries for those involved in motorcycle accidents between the years 1975 and 1976. This increase is statistically significant ($X^2 = 6.17$ $p = .01$).

B. Within the geographic boundaries of the study and the time periods, the rate of head injury for those who were wearing helmets at the time of motorcycle accident is 110 injuries per one thousand persons involved in motorcycle accidents. The rate of injury for those involved in motorcycle accidents without the benefit of helmets is 118 percent greater, or 240 injuries per thousand individuals involved in motorcycle accidents. This increase in the incidence of head trauma is extremely significant ($X^2 = 21.40$ $p = .0001$).

C. Between 1975 and 1976 the rate of general body injuries for those involved in motorcycle accidents increased by 29.7 percent, from 357 injuries per thousand individuals in 1975 to 463 per thousand individuals in 1976. This increase is statistically significant ($X^2 = 8.45$ $p = .01$). This increase in general body trauma probably represents those persons who received medical attention because of their head injuries and also received general body injuries. If these persons had not received head injuries, they probably would not have received medical attention for minor injuries in the general body area. This assumption is made on the basis that the great majority of accidents studied showed signs of minor general body injuries as noted by the investigating police officer. Only accident victims that actually presented to an emergency facility were included in the study as injury victims.

D. General body injuries received by those persons not wearing helmets occurred 48.3 percent more often than similar injuries for those involved in motorcycle accidents while wearing helmets. The rate for the helmeted group was 356 injuries per thousand persons, while the rate for the non-helmeted group was 528 injuries per thousand persons involved in motorcycle accidents. This emphasizes the fact that many people who seek medical attention for head injuries also reported general body injuries.

E. Sixty-six percent of the head injuries suffered by those wearing helmets at the time of accident scored AIS 1. Forty-nine percent of those who were not wearing a helmet at the time of accident scored AIS 1. By contrast, only six percent of those wearing helmets at the time of accident received injuries with a score of AIS 5, while 17 percent of those not wearing a helmet at the time of motorcycle accidents received a head injury with AIS score 5. These distributions are not statistically significant (X^2 (3) = 3.874 p = .2753).

4.3 Fatal Accidents

Within the geographic boundaries and the time periods of this study 17 fatalities occurred as a result of motorcycle accidents. Data concerning these accidents is reported in section 3, and the following conclusions are based on this data.

A. Between the 1975 portion of the study and the 1976 portion, there was an increase of 62.7 percent in the crude death rate for persons involved in motorcycle accidents, from 17.3 fatalities per one thousand persons involved in motorcycle accidents in 1975 to 28.1 fatalities per one thousand persons during 1976. This increase is not statistically significant (X^2 = .96 p = .33).

B. On the basis of helmet use, the crude death rate for those not wearing helmets at the time of motorcycle accidents was 185 percent greater than the crude death for those persons who were protected by a helmet at the time of motorcycle accident. The crude death rate for those wearing helmets at the time of accident was 14.3 fatalities per one thousand persons, while the crude death rate for those not wearing helmets at the time of accident was 40.7 fatalities per one thousand persons. This difference is significant (X^2 = 5.09 p = .024).

REFERENCES

1. Kraus, J.F., Riggins, R.S. and Franti, C.E., "Some Epidemiologic Features of Motorcycle Collision Inuries." American Journal of Epidemiology, 102(1): 74 - 109, July, 1975.

2. "Annual Summary of Vital Statistics". Division of Vital Statistics, Kansas State Department of Health and Environment, 1976.

3. "Accident Facts". The National Safety Council, 1977

APPENDIX A

FORMS USED IN THIS PROJECT

DESCRIPTION	PAGE
Kansas Vehicle Accident Report (long form)	A-2
Kansas Vehicle Assicent Report (short form)	A-6
Patient Scoring and Information Form	A-10
Patient Summary Form (motorcycle driver)	A-11
Patient Summary Form (motorcycle passenger)	A-12
Roadside Survey Form	A-13

KANSAS DEPARTMENT OF REVENUE/VEHICLE ACCIDENT REPORT

Long Form

'01—TAR 1/72

Page 1

TIME

DATE Mo Da Yr TIME AM PM MN Day of week

of accident ☐☐☐

IN County

City

LOCATION

ON Name of street/highway Highway No. Mile post

AT Name of intersecting street/highway Highway No.

IF NOT AT INTERSECTION ☐ ft. ☐ mi. } ☐ N ☐ S ☐ E ☐ W of Cross street

IF OUTSIDE CITY LIMITS, indicate distance from specific reference

☐ ft. ☐ mi. } ☐ N ☐ S ☐ E ☐ W and ☐ ft. ☐ mi. } ☐ N ☐ S ☐ E ☐ W

of

Give specific, uniquely identifiable, locatable reference—mile post, street, house number, bridge number, culvert, other landmark

STATE ACCIDENT NO.

SPECIAL NOTATION

VEHICLE 1

Make Year

Make & Type (HD, etc.)

Odometer

LICENSE PLATE State Number Yr or ex. date

ICC ☐ Yes ☐ No Route, Permit, or Tag No.

OWNER Name Last First Middle

Address No. Street City State ZIP

VEHICLE DAMAGE

Motorcycle 20 Rear 14 Top 15 Undercarriage 17 Overturned 18 Towed

SEVERITY

No damage ☐ 0

Disabling ☐ 1

Functional ☐ 2

Other ☐ 9

No. of occupants incl. driver ☐

DRIVER 1

DRIVER Name Last First Middle

Address No. Street City State ZIP

Birth date Mo Da Yr Age Sex Occupation

CODE Page 1 Lap belt Shoulder harness Head restraint Ejected? Injury severity

DRIVER LICENSE State Type

No.

RESTRICTNS Valid

None ☐

CODED

Copy from license

WRITTEN

Note in margin

Statement of driver:

VEHICLE 2

Make Year

Make & Type (HD, etc.)

Odometer

PLATE State Number Yr or ex. date

ICC ☐ Yes ☐ No Route, Permit, or Tag No.

OWNER Name Last First Middle

Address No. Street City State ZIP

VEHICLE DAMAGE

Motorcycle 20 Rear 14 Top 15 Undercarriage 17 Overturned 18 Towed

SEVERITY

No damage ☐ 0

Disabling ☐ 1

Functional ☐ 2

Other ☐ 9

No. of occupants incl. driver ☐

DRIVER 2

DRIVER Name Last First Middle

Address No. Street City State ZIP

Birth date Mo Da Yr Age Sex Occupation

CODE Page 1 Lap belt Shoulder harness Head restraint Ejected? Injury severity

DRIVER LICENSE State Type

No.

RESTRICTNS Valid

None ☐

CODED

Copy from license

WRITTEN

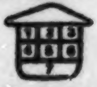
Note in margin

Statement of driver:

CODES

VEHICLE No. as assigned—1, 2 Witness (not a pass.)—W

SEAT POSITION



Passenger car seats—1 to 6

Station wagon, rear or side facing, all—7

Motorcycle passenger—8

Occupants of truck, bus or other vehicle—9

Position unknown—9

LAP BELT AND SHOULDER HARNESS (each to be coded)

Not installed—0

Not fastened—1

Fastened, properly adjusted—2

Fastened, not properly adjusted—3

Failed—4

Unknown if used—5

Not applicable (e. g., motorcycle)—9

HEAD RESTRAINT

Not installed—0

Adjusted to proper height—2

Not adjusted to proper height—3

Failed—4

Unknown if adjusted—5

Not applicable—9

INJURY SEVERITY

No injury—0

Fatal—1

Incapacitating—2

Non-incapacitating—3

Possible—4

Unknown—5

EJECTED FROM VEHICLE No—0; Fully—1; Partially—2; Unknown—5

MICROFILMED FROM BEST AVAILABLE COPY

POSSIBLE CONTRIBUTING CIRCUMSTANCES

[illegible]ACE

[illegible]

ROAD ALIGNMENT /GRADE

	on	at	
Straight, level	☐	☐	1
Straight, grade	☐	☐	2
Straight, hillcrest	☐	☐	3
Curve, level	☐	☐	4
Curve, grade	☐	☐	5
Curve, hillcrest	☐	☐	6
Not stated	☐	☐	7

ROAD SURFACE CONDITION

	on	at	
Dry	☐	☐	1
Wet	☐	☐	2
Water concentration	☐	☐	3
Snowy/icy	☐	☐	4
Slippery (mud, oil, etc.)	☐	☐	5
Unknown	☐	☐	6
______	☐	☐	7
______	☐	☐	7
Other (specify)			

ROAD BASE CONDITION

	on	at	
Not a contributing factor	☐	☐	0
Holes, ruts, bumps, etc.	☐	☐	1
Loose material on surface	☐	☐	2
Construction/repair	☐	☐	3
Detour	☐	☐	4
Soft/washed/sunken shldr.	☐	☐	5
Obstruction—no warning	☐	☐	6
______	☐	☐	7
______	☐	☐	7
Other (specify)			

TRAFFIC CONTROL

	on	at	
Stop sign	☐	☐	1
Signals or flasher	☐	☐	2
RR gates/signals	☐	☐	3
Warning signs	☐	☐	4
Center line/edge mark	☐	☐	5
No-pass zone	☐	☐	6
None present	☐	☐	7
Not operating	☐	☐	8
______	☐	☐	9
______	☐	☐	9
Other (specify)			

PRIOR TO COLLISION

Dr. 1 headed ☐N ☐E ☐S ☐W on ______ at ______ | ______ | ______

Dr. 2 headed ☐N ☐E ☐S ☐W on ______ at ______ | ______ | ______

SPEEDS—Driver stated | Est'd | Lawful

and INTENDED to:

	1	2	
Go straight, follow roadway	☐	☐	A
Change lane or overtake	☐	☐	B
Slow or stop	☐	☐	C
Remain stopped in traf. lane	☐	☐	D
Start forward from stop/park	☐	☐	E
Back up from stop/park	☐	☐	F
Turn left	☐	☐	G
Turn right	☐	☐	H
Turn U	☐	☐	J
Remain parked	☐	☐	K
______	☐	☐	L
______	☐	☐	L
Other (specify)			

DRIVER ACTION
apparently contributing

	1	2	
Illegal or unsafe speed	☐	☐	A
Impeding traffic	☐	☐	B
Following too closely	☐	☐	C
Improper overtaking	☐	☐	D
Improper turn	☐	☐	E
Improper start/stop/park	☐	☐	F
Traf. control viol'n—lights	☐	☐	G
Traf. control viol'n—signs	☐	☐	H
Fail to yield ROW	☐	☐	J
Drove left of center	☐	☐	K
No or improper signal	☐	☐	L
Inattention	☐	☐	M
Avoiding veh/object/ped.	☐	☐	N
None	☐	☐	P
______	☐	☐	Q
______	☐	☐	Q
Other (specify)			

VEHICLE DEFECTS
apparently contributing

	1	2	
None apparent	☐	☐	A
Brakes	☐	☐	B
Headlights	☐	☐	C
Tail lights	☐	☐	D
Brake (stop) lights	☐	☐	E
Turn lights	☐	☐	F
Windshield wiper	☐	☐	G
Tires—flat	☐	☐	H
Tires—worn	☐	☐	J
Steering	☐	☐	K
______	☐	☐	L
______	☐	☐	L
Other (specify)			
Modified vehicle			
______	☐	☐	M
______	☐	☐	M
(specify mod'n)			

VISIBILITY

	Driver 1	Driver 2	Ped	
Vision *not* obscured	☐	☐	☐	0
Vision obscured by:				
Rain, snow, fog, etc.	☐	☐	☐	1
Windshield or car loading	☐	☐	☐	2
Trees, signs, fixed objects	☐	☐	☐	3
Parked/moving vehicles	☐	☐	☐	4
Blinding headlights, sun	☐	☐	☐	5
Darkness	☐	☐	☐	6
______	☐	☐	☐	7
______	☐	☐	☐	7
Other (specify)				

CONDITION PRIOR

	Driver 1	Driver 2	Ped	
Physical defect	☐	☐	☐	1
Ill	☐	☐	☐	2
Fatigued	☐	☐	☐	3
Apparently asleep	☐	☐	☐	4
Apparently normal	☐	☐	☐	5
Had apparently used:				
Medication	☐	☐	☐	6
Prescription drugs	☐	☐	☐	7
Illegal drugs/narcotics	☐	☐	☐	8
Alcohol	☐	☐	☐	9
______	☐	☐	☐	0
______	☐	☐	☐	0
Other (specify)				

Complete this column if 'Alcohol' was checked in CONDITION PRIOR section

ALCOHOL INTAKE

	Driver 1	Driver 2	Ped	
Had been drinking:				
Accident factor (AF)	☐	☐	☐	1
No accident factor	☐	☐	☐	2
Unknown whether AF	☐	☐	☐	3

COORDINATION TEST

	Driver 1	Driver 2	Ped	
Not given	☐	☐	☐	0
Given at: Accident	☐	☐	☐	1
Other______	☐	☐	☐	2
Conclusion—Ability to drive/walk				
Not impaired	☐	☐	☐	0
Impaired	☐	☐	☐	1

CHEMICAL TEST RESULTS

Type code	Drv.	Test Type	BAL
Refused—R	1	______ 0	______
Breath—B			
Blood—L			
Urine—U	2	______ 0	______
Saliva—S			
No test—N	Ped	______ 0	______

Refusal Notice to DOV ☐

1		8	

WEATHER

Clear	☐	1
Cloudy	☐	2
Raining	☐	3
Snowing/Sleet	☐	4
Fog	☐	5
______	☐	6
Other (specify)		
Windy	☐	1
Gusty	☐	2
Dusty	☐	3
______	☐	4
Other (specify)		

LIGHT CONDITION

Daylight	☐	1
Dawn/dusk	☐	2
Dark, str. lights on	☐	3
Dark, no lights	☐	4
Unknown	☐	5

DEBRIS

HAZARDOUS WITH		
Removal problem	☐	1
Routine removal	☐	2
NON-HAZARDOUS WITH		
Removal problem	☐	3
Routine removal	☐	4
MINIMAL OR		
No debris	☐	5

Explain 1, 2, or 3______

PEDESTRIAN-PEDALCYCLE

For pedestrian accidents, also check 5 data elements above: Visibility, condition, alcohol, coordination, chemical test.

See CODES

NAME & ADDRESS	Last	First	Middle	No. Street	City	State	ZIP	Sex	[redacted]	Age	Inj. Sev.

Pedestrian was going ☐N ☐E ☐S ☐W ☐along ☐across or into Street, highway no. ______ from ______ to ______

[redacted]

ACTIONS PRIOR

Crossing at intersection, X/walk, with signal	☐	1
Crossing *not* at inters'n/X-walk, or against signal	☐	2
Walking/standing in roadway on______side	☐	3
Playing in roadway	☐	4
Other activity in roadway______	☐	5
Off roadway	☐	6
Not stated (unknown)	☐	7

CLOTHING COLOR WAS:

______

______ with:

No or little contrast with background —probably contributing factor (C.F.)	☐	1
Good contrast with background —probably not C.F.	☐	2
Unknown whether clothing color a C.F.	☐	3

EXTERNAL VEHICLE FEATURES of striking vehicle contributing to injury severity

None	☐	1	Explain:
Possibly	☐	1	
Probably	☐	2	
Unknown	☐	3	

NARRATIVE—Describe what, in your opinion, happened. Refer to vehicles and drivers by numbers assigned in report

DIAGRAM WHAT HAPPENED—Draw scene as observed. Refer to vehicles and drivers by numbers assigned in report.

Show: (1) Outlines of streets and access points. Identify specifically by name/number.
(2) Paths of units prior to and after impact, skidmarks, and point of impact (POI).
(3) Locations of signs, traffic controls, and reference points.
(4) Locations of other property hit/damaged (trees, signs, etc).
(5) Special features of the location (bridge, overpass, culvert, etc.)
(6) Locations of temporary highway conditions.
(7) All measurements to locate the accident relative to a specific, fixed, uniquely identifiable and locatable reference point.

○ Indicat
NORTH
by arr

No. of driving lanes in use
at time of accident
in direction of travel of
V1 ___ V2 ___ V3 ___

Officer's
Initials

PROPERTY

List OTHER PROPERTY DAMAGED OR OBJECT HIT in sequence of events during accident (Fixed objects, animals, railroad, pedalcycle, etc.)

	OBJECT AND NATURE OF DAMAGE (Show location in diagram of accident)		NAME AND ADDRESS OF OWNER			Approx. cost to repair/ replace
1						
2						
3						

PASSENGERS — WITNESSES

ALL OTHER PERSONS INVOLVED IN ACCIDENT—*include passengers and witnesses (W) (not a pagr.); exclude drivers and pedestrians.* See CODES Pg. 1

Ref	Veh or W	Seat No	NAME Last	First	Middle	ADDRESS No	Street	City	State	ZIP	Sex	Age	Lap belt	Shld harn	Head restr	Ejec	Inj Sev
A																	
B																	
C																	
D																	
E																	
F																	
G																	
H																	
J																	
K																	
L																	
M																	

Use space also, if desired, to record Nature and extent of injuries Moved to By Phone

MOTORCYCLE

MOTORCYCLE DRIVING INSTRUCTION

from
Dealer ☐ 1
App'd school M/C
Dr. Educ'n course ☐ 2
Friend ☐ 3
Unknown ☐ 4
Self ☐ 5
Other (specify) ☐ 6

Driver No ☐ ☐

SAFETY EQUIPMENT ON MOTORCYCLE

Rear view mirror installed? No ☐ 0 Yes ☐ 1

Passenger facilities
No passenger involved ☐ 0
Passenger involved—was provided with:
Seat and foot rest ☐ 1
Seat only ☐ 2
Foot rest only ☐ 3
Neither seat nor foot rest ☐ 4

PROTECTIVE EQUIPMENT WORN

	Driver Helmet	Driver Eye Prot		Passgr Helmet		Pagr Ref.
				☐	☐	
Not available	☐	☐	0	☐	☐	
Not worn	☐	☐	1	☐	☐	
Worn—not strapped	☐	☐	2	☐	☐	
Worn—not damaged	☐	☐	3	☐	☐	
Worn—damaged	☐	☐	4	☐	☐	
Unknown	☐	☐	5	☐	☐	
Helmet approved per ANS Spec. Z90.1-1966 Yes	☐		Yes	☐	☐	
No	☐		No	☐	☐	

☐ ☐ ☐

SUMMARY

TYPE OF ACCIDENT (FIRST HARMFUL EVENT)

Non-collision
Overturned ☐ A
Other non-collision ☐ B
Collision with another Motor Vehicle
In transport, same roadway ☐ C
In transport, other roadway ☐ D
Parked ☐ E

Collision with other than Motor Vehicle
Railway train ☐ F
Pedestrian ☐ G
Pedalcycle ☐ H
Animal ☐ J
Fixed object ☐ K
Other object ☐ L

ACCIDENT SEVERITY

Most severe injury
No injury ☐ 0
Fatal ☐ 1
Incapacitating ☐ 2
Non-incapacitating ☐ 3
Possible ☐ 4

Most severe damage
No damage ☐ 0
Disabling ☐ 1
Functional ☐ 2
Other—to vehicle ☐ 3
Non-vehicle only ☐ 4

Total number of vehicles involved ☐

Total number of people involved (excluding witnesses) .... ____
Number of pedestrians .... ____
Total killed .... ____
Total injured .... ____
Total property damage (vehicle and other) greater than $300? Yes ☐ 1 No ☐ 0

ENFORCEMENT ACTION

ARRESTS, CITATIONS None ☐

Driver No	Charge	

INVESTIGATION
Is investigation complete? No ☐ Yes ☐
Where else was investigation carried on?

Photos taken by: None ☐ Investigating agency ☐ Other (specify) ☐

Driver Fin. Resp. form furnished to drivers:
No. 1 ☐ No. 2 ☐ No. 3 ☐ No. 4 ☐

Suggestions for safety improvements should be made to cognizant agency via law enforcement agency.

INVESTIGATING OFFICERS (Please print) Name Badge No. Beat Detail

Date of report:

NAME OF INVESTIGATING AGENCY

☐ ☐ ☐ ☐ ☐ ☐ ☐

Forward within 5 days to: Kansas Department of Revenue, Division of Vehicles, Topeka, Kansas 66626

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KANSAS DEPARTMENT OF REVENUE/VEHICLE ACCIDENT REPORT

Short Form Page 1

TIME

Date Mo Da Yr Time AM PM Mil Day of week

of accident ☐☐☐

notified of acc. ☐☐☐

arrived at scene ☐☐☐

IN County

City

LOCAL CASE NO.

If OUTSIDE CITY LIMITS, indicate distance from specific reference

☐ ft ☐ mi ☐ N ☐ S ☐ E ☐ W and ☐ ft ☐ mi ☐ N ☐ S ☐ E ☐ W

STATE ACCIDENT NO.

SPECIAL NOTATION

LOCATION

ON Name of street/highway Highway No Mile post

AT Name of intersecting street/highway Highway No

VEHICLE 1

Make & Type Color Year Vehicle License Plate State Number Yr to be plate

Towed vehicle VIN or License (trailer vehicle) ICC ☐ Yes ☐ No Route Permit, or Tag No Hours on duty

Vehicle removed to by VIN (Veh. Ident. No.)

OWNER Name Last First Middle Phone

Address No Street City State ZIP

VEHICLE DAMAGE

CIRCLE NUMBERS for damaged area. Draw ARROW for direction of initial impact

1 2 3 4 5 6

13 Head 14 Roof 14 Trunk 15

12 11 10 9 8 7

Windshield 16 Undercarriage 17 Overturn 18 Towed vehicle 19

SEVERITY

No damage ☐ 0

Disabling ☐ 1

Functional ☐ 2

Other ☐ 3

No. of occupants incl driver ☐

DRIVER 1

DRIVER Name Last First Middle Phone

Address No Street City State ZIP

Birth date Mo Da Yr Age Race Sex Occupation Employer/School

Lap belt Shoulder harness Head restraint Ejected? Injury severity Yr. driving experience

Nature and extent of injuries Removed to, by

DRIVER LICENSE State Type

No

Expir. date

Soc. Sec. No. (if no license)

RESTRICTIONS Valid

None ☐ 0

CODED Copy from license

WRITTEN

On license Yes No

☐ ☐ ☐

☐ ☐ ☐

☐ ☐ ☐

☐1 ☐ ☐

VEHICLE 2

Make & Type Color Year Vehicle License Plate State Number Yr to be plate

Towed vehicle VIN or License (towed vehicle) ICC ☐ Yes ☐ No Route Permit, or Tag No Hours on duty

Vehicle removed to by VIN (Veh. Ident. No.)

OWNER Name Last First Middle Phone

Address No Street City State ZIP

VEHICLE DAMAGE

CIRCLE NUMBERS for damaged area. Draw ARROW for direction of initial impact

1 2 3 4 5 6

13 Head 14 Roof 14 Trunk 15

12 11 10 9 8 7

Windshield 16 Undercarriage 17 Overturn 18 Towed vehicle 19

SEVERITY

No damage ☐ 0

Disabling ☐ 1

Functional ☐ 2

Other ☐ 3

No. of occupants incl driver ☐

DRIVER 2

DRIVER Name Last First Middle Phone

Address No Street City State ZIP

Birth date Mo Da Yr Age Race Sex Occupation Employer/School

Lap belt Shoulder harness Head restraint Ejected? Injury severity Yrs. driving experience

Nature and extent of injuries Removed to, by

DRIVER LICENSE State Type

No

Expir. date

Soc. Sec. No. (if no license)

RESTRICTIONS Valid

None ☐ 0

CODED Copy from license

WRITTEN

On license Yes No

☐ ☐ ☐

☐ ☐ ☐

☐ ☐ ☐

☐1 ☐ ☐

PASSENGERS / WITNESSES

ALL OTHER PERSONS INVOLVED IN ACCIDENT—include passengers and witnesses (W) (not a pass.); exclude drivers and pedestrians. See CODES Pg. 3

Ref	Veh. or W	Seat No	NAME Last	First	Middle	ADDRESS No	Street	City	State	ZIP	Sex	Age	Lap belt	Sh'd harn	Head restr	Ejec	Inj Sev
A																	
B																	
C																	
D																	
E																	
F																	
G																	
H																	
J																	

Use space also, if desired, to record Nature and extent of injuries Moved to By Phone

G-TAR (Rev. 7/72)

PROPERTY

List OTHER PROPERTY DAMAGED OR OBJECT HIT in sequence of events during accident (Fixed objects, animals, railroad, pedalcycle, etc.)

	OBJECT AND NATURE OF DAMAGE (Show location in diagram of accident)	144	NAME AND ADDRESS OF OWNER	Notified Y	Notified N	Phone	Approx cost to repair/replace
1							
2							

POSSIBLE CONTRIBUTING CIRCUMSTANCES

ROAD SURFACE MATERIAL on at
- Concrete ☐ ☐ 1
- Blacktop ☐ ☐ 2
- Brick ☐ ☐ 3
- Gravel ☐ ☐ 4
- Dirt ☐ ☐ 5
- ______ ☐ ☐ 6
- ______ ☐ ☐ 6
- Other (specify)

ROAD ALIGNMENT /GRADE ☐ on at
- Straight, level ☐ ☐ 1
- Straight, grade ☐ ☐ 2
- Straight, hillcrest ☐ ☐ 3
- Curve, level ☐ ☐ 4
- Curve, grade ☐ ☐ 5
- Curve, hillcrest ☐ ☐ 6
- Not stated ☐ ☐ 7

ROAD SURFACE CONDITION ☐ on at
- Dry ☐ ☐ 1
- Wet ☐ ☐ 2
- Water concentration ☐ ☐ 3
- Snowy/icy ☐ ☐ 4
- Slippery (mud, oil, etc.) ☐ ☐ 5
- Unknown ☐ ☐ 6
- ______ ☐ ☐ 7
- ______ ☐ ☐ 7
- Other (specify)

ROAD BASE CONDITION ☐ on at
- Not a contributing factor ☐ ☐ 0
- Holes, ruts, bumps, etc ☐ ☐ 1
- Loose material on surface ☐ ☐ 2
- Construction/repair ☐ ☐ 3
- Detour ☐ ☐ 4
- Soft/washed/sunken shldr. ☐ ☐ 5
- Obstruction—no warning ☐ ☐ 6
- ______ ☐ ☐ 7
- ______ ☐ ☐ 7
- Other (specify)

TRAFFIC CONTROL on at ☐
- Stop sign ☐ ☐ 1
- Signals or flasher ☐ ☐ 2
- RR gates/signals ☐ ☐ 3
- Warning signs ☐ ☐ 4
- Center line/edge mark ☐ ☐ 5
- No pass zone ☐ ☐ 6
- None present ☐ ☐ 7
- Not operating ☐ ☐ 8
- ______ ☐ ☐ 9
- ______ ☐ ☐ 9
- Other (specify)

PRIOR TO COLLISION ☐

			SPEEDS—Driver stated	Est'd ☐	Posted
Dr. 1 headed ☐ N ☐ E ☐ S ☐ W	on ______	at			
Dr. 2 headed ☐ N ☐ E ☐ S ☐ W	on ______	at			

and INTENDED to ☐

	1	2	
Go straight, follow roadway	☐	☐	A
Change lane or overtake	☐	☐	B
Slow or stop	☐	☐	C
Remain stopped in traf. lane	☐	☐	D
Start forward from stop/park	☐	☐	E
Back up from stop/park	☐	☐	F
Turn left	☐	☐	G
Turn right	☐	☐	H
Turn U	☐	☐	J
Remain parked	☐	☐	K
______	☐	☐	L
______	☐	☐	L
Other (specify)			

DRIVER ACTION ☐
apparently contributing

	1	2	
Illegal or unsafe speed	☐	☐	A
Impeding traffic	☐	☐	B
Following too closely	☐	☐	C
Improper overtaking	☐	☐	D
Improper turn	☐	☐	E
Improper start/stop/park	☐	☐	F
Traf. control viol'n—lights	☐	☐	G
Traf. control viol'n—signs	☐	☐	H
Fail to yield ROW	☐	☐	J
Drove left of center	☐	☐	K
No or improper signal	☐	☐	L
Careless/Inattention	☐	☐	M
Avoiding veh/object/ped	☐	☐	N
None	☐	☐	P
______	☐	☐	O
______	☐	☐	O
Other (specify)			

VEHICLE DEFECTS ☐
Apparently contributing

	1	2	
None apparent	☐	☐	A
Brakes	☐	☐	B
Headlights	☐	☐	C
Tail lights	☐	☐	D
Brake (stop) lights	☐	☐	E
Turn lights	☐	☐	F
Windshield wiper	☐	☐	G
Tires—flat	☐	☐	H
Tires—worn	☐	☐	J
Steering	☐	☐	K
______	☐	☐	L
______	☐	☐	L
Other (specify)			
Modified vehicle			
______	☐	☐	M
______	☐	☐	M
(specify mod'n)			

VISIBILITY ☐

	Driver 1	Driver 2	
Vision not obscured	☐	☐	0
Vision obscured by:			
Rain, snow, fog, etc.	☐	☐	1
Windshield or car loading	☐	☐	2
Trees, signs, fixed objects	☐	☐	3
Parked/moving vehicles	☐	☐	4
Blinding headlights, sun	☐	☐	5
Darkness	☐	☐	6
______	☐	☐	7
______	☐	☐	7
Other (specify)			

CONDITION PRIOR ☐

	Driver 1	Driver 2	
Physical defect	☐	☐	1
Ill	☐	☐	2
Fatigued	☐	☐	3
Apparently asleep	☐	☐	4
Apparently normal	☐	☐	5
Had apparently used			
Medication	☐	☐	6
Prescription drugs	☐	☐	7
Illegal drugs/narcotics	☐	☐	8
Alcohol	☐	☐	9
______	☐	☐	0
______	☐	☐	0
Other (specify)			

Complete this column if 'Alcohol' was checked in CONDITION PRIOR section

ALCOHOL INTAKE ☐ ☐

	Driver 1	Driver 2	
Had been drinking:			
Accident factor (AF)	☐	☐	1
No accident factor	☐	☐	2
Unknown whether AF	☐	☐	3

COORDINATION TEST ☐ ☐

	Driver 1	Driver 2	
Not given	☐	☐	0
Given at: Accident	☐	☐	1
Other ______	☐	☐	2
Conclusion—Ability to drive/walk			
Not impaired	☐	☐	0
Impaired	☐	☐	1

CHEMICAL TEST RESULTS

Type code	Driv ☐	Test Type	BAL
Refused—R	1	______	0. ______
Breath—B	2	______	0. ______
Blood—L			
Urine—U			
Saliva—S			
No test—N			

Refusal Notice to DOV ☐

118 1 ☐ 2 ☐

WEATHER ☐
- Clear ☐ 1
- Cloudy ☐ 2
- Raining ☐ 3
- Snowing/Sleet ☐ 4
- Fog ☐ 5
- ______ ☐ 6
- Other (specify)
- Windy ☐ 1
- Gusty ☐ 2
- Dusty ☐ 3
- ☐ 4

LIGHT CONDITION ☐
- Daylight ☐ 1
- Dawn/dusk ☐ 2
- Dark, str. lights on ☐ 3
- Dark, no lights ☐ 4
- Unknown ☐ 5

DEBRIS ☐

HAZARDOUS WITH
- Removal problem ☐ 1
- Routine removal ☐ 2

NON-HAZARDOUS WITH
- Removal problem ☐ 3
- Routine removal ☐ 4

MINIMAL OR
- No debris ☐ 5

Explain 1, 2, or 3. ______

☐ ☐

MOTORCYCLE

MOTORCYCLE DRIVING INSTRUCTION ☐

from
- Dealer ☐ 1
- Appr'd school M/C
- Dr. Educ'n course ☐ 2
- Friend ☐ 3
- Unknown ☐ 4
- Self ☐ 5
- ☐ 6
- Other (specify)

Driver No. ☐ ☐

SAFETY EQUIPMENT ON MOTORCYCLE ☐

Rear view mirror installed? No ☐ 0 Yes ☐ 1

Passenger facilities ☐
- No passenger involved ☐ 0
- Passenger involved— was provided with:
  - Seat and foot rest ☐ 1
  - Seat only ☐ 2
  - Foot rest only ☐ 3
  - Neither seat nor foot rest ☐ 4

PROTECTIVE EQUIPMENT WORN ☐ ☐ ☐

	Driver Helmet	Driver Eye Prot		Passgr Helmet	
				☐	☐
Not available	☐	☐	0	☐	☐
Not worn	☐	☐	1	☐	☐
Worn—not strapped	☐	☐	2	☐	☐
Worn—not damaged	☐	☐	3	☐	☐
Worn—damaged	☐	☐	4	☐	☐
Unknown	☐	☐	5	☐	☐
Helmet approved per ANS Spec. Z90.1-1966	☐ Yes			☐	☐
	☐ No			☐	☐

TYPE OF ACCIDENT (FIRST HARMFUL EVENT) ☐

Non-collision
- Overturned ☐ A
- Other non-collision ☐ B

Collision with another Motor Vehicle
- In transport, same roadway ☐ C
- In transport, other roadway ☐ D
- Parked ☐ E

Collision with other than Motor Vehicle
- Railway train ☐ F
- Pedestrian ☐ G
- Pedalcycle ☐ H
- Animal ☐ J
- Fixed object ☐ K
- Other object ☐ L

ACCIDENT SEVERITY ☐

Most severe injury
- No injury ☐ 0
- Fatal ☐ 1
- Incapacitating ☐ 2
- Non-incapacitating ☐ 3
- Possible ☐ 4

Most severe damage
- No damage ☐ 0
- Disabling ☐ 1
- Functional ☐ 2
- Other—to vehicle ☐ 3
- Non-vehicle only ☐ 4

No. of Vehicles involved ☐

SUMMARY

TOTAL NUMBER	People involved* ☐	Pedestrians ☐	People killed ☐	People injured ☐	Total property damage (vehicle and other) greater than $200
112 ☐ 114 ☐ 116 ☐					Yes ☐ 1 No ☐ 0 ☐

* excluding witnesses

ENFORCEMENT ACTION

ARRESTS CITATIONS None ☐

Driver No	Charge	181	Ticket No	Court Date Time	Driver No	Charge	181	Ticket No	Court Date/Time

INVESTIGATION Where else was investigation carried on? ______ Is investigation complete? No Yes

Photos taken by: None ☐ Investigating agency ☐ Other (specify) ☐

Suggestions for safety improvements should be made to cognizant agency via law enforcement agency

Driver Fin. Resp. form furnished to drivers No. 1 ☐ No. 2 ☐ No. 3 ☐ No. 4 ☐

INVESTIGATING OFFICERS (Please print)	Name	Badge No	Beat	Detail

NAME OF INVESTIGATING AGENCY ______ 188 ☐

Date of report ______ Report reviewed by: ______

140 ☐ 141 ☐ 142 ☐ 144 ☐ 145 ☐ 146 ☐

Forward within 5 days to: Kansas Department of Revenue, Division of Vehicles, Topeka, Kansas 66626

DIAGRAM WHAT HAPPENED Draw scene as observed. Refer to vehicles and drivers by numbers assigned in report.

Show
(1) Outlines of streets and access points. Identify specifically by name/number
(2) Paths of units prior to and after impact, skidmarks, and point of impact (POI)
(3) Locations of signs, traffic controls, and reference points
(4) Locations of other property hit/damaged (trees, signs, etc)
(5) Special features at the location (bridge, overpass, culvert, etc.)
(6) Locations of temporary highway conditions.
(7) All measurements to locate the accident relative to a specific, fixed, uniquely identifiable and locatable reference point

Indicate
NORTH
by arrow

No. of driving lanes in use
at time of accident
in direction of travel of
V1 ___ V2 ___ V3 ___

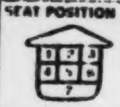
Officer's
Initials

NARRATIVE Describe what, in your opinion, happened. Refer to vehicles and drivers by numbers assigned in report. Include statements of drivers, if warranted.

CODES

VEHICLE No. as assigned—1, 2
Witness (not a pass.)—W

SEAT POSITION



Passenger car seats—1 to 6
Station wagon, rear or side facing, all—7
Motorcycle passenger—8
Occupants of truck, bus or other vehicle—9
Position unknown—0

LAP BELT AND SHOULDER HARNESS
(each to be coded)
Not installed—0
Not fastened—1
Fastened, properly adjusted—2
Fastened, not properly adjusted—3
Failed—4
Unknown if used—5
Not applicable (e.g., motorcyclist)—8

HEAD RESTRAINT
Not installed—0
Adjusted to proper height—2
Not adjusted to proper height—3
Failed—4
Unknown if adjusted—5
Not applicable—8

INJURY SEVERITY
No injury—0
Fatal—1
Incapacitating—2
Non-incapacitating—3
Possible—4
Unknown—5

EJECTED FROM VEHICLE
No—0; Fully—1; Partially—2; Unknown—5

VEHICLE 3

Make / Year | Make & Type (4D etc.) | Color | ☐ ☐ ☐ | Odometer

Towed Vehicle | V.I.N. or License (towed vehicle)

Vehicle removed to | by

Owner's Name: Last | First | Middle | Phone

Address: No. | Street | City | State | ZIP

LICENSE PLATE | State | Number | Yr. exp. date

ICC ☐ Yes ☐ No | Permit, or Tag No. | Hours on duty :

V.I.N. (Veh. Ident. No.)

VEHICLE DAMAGE

CIRCLE NUMBERS for damaged areas
place ARROW for direction of initial impact

Est'd $______

1 ⋮ 2 ⋮ 3 ⋮ 4 ⋮ 5 ⋮ 6

13 Hood Roof 14 Trunk 15

12 ⋮ 11 ⋮ 10 ⋮ 9 ⋮ 8 ⋮ 7

Undercarriage 16 | Under-carriage 17 | Overturn 18 | Motorcycle 20 | Loaded 19

SEVERITY
No damage [ ] 0
Disabling [ ] 1
Functional [ ] 2
Other [ ] 3

No. of occupants incl. driver ☐

DRIVER 3

Driver's Name: Last | First | Middle | Phone

Address: No. | Street | City | State | ZIP

Birth date: Mo. Da. Yr. | Age | Race | Sex | Occupation | Employer/School

CODE Page 1 | Lap belt | Shoulder harness | Head restraint | Ejected? | Injury severity | Yrs. driving experience

Nature and extent of injuries | Removed to, by:

DRIVER LICENSE | State | Type

No.

Expir. date

Soc. Sec. No. (if no license)

RESTRICTIONS | Valid

	On license	Yes 1	No 0
None ☐ 0	☐	☐	☐
CODED Copy from license	☐	☐	☐
	☐	☐	☐
WRITTEN Note in margin	☐ 1	☐	☐

VEHICLE 4

Make / Year | Make & Type (4D etc.) | Color | ☐ ☐ ☐ | Odometer

Towed Vehicle | V.I.N. or License (towed vehicle)

Vehicle removed to | by

Owner's Name: Last | First | Middle | Phone

Address: No. | Street | City | State | ZIP

LICENSE PLATE | State | Number | Yr. exp. date

ICC ☐ Yes ☐ No | Permit, or Tag No. | Hours on duty :

V.I.N. (Veh. Ident. No.)

VEHICLE DAMAGE

CIRCLE NUMBERS for damaged areas
place ARROW for direction of initial impact

Est'd $______

1 ⋮ 2 ⋮ 3 ⋮ 4 ⋮ 5 ⋮ 6

13 Hood Roof 14 Trunk 15

12 ⋮ 11 ⋮ 10 ⋮ 9 ⋮ 8 ⋮ 7

Undercarriage 16 | Under-carriage 17 | Overturn 18 | Motorcycle 20 | Loaded 19

SEVERITY
No damage [ ] 0
Disabling [ ] 1
Functional [ ] 2
Other [ ] 3

No. of occupants incl. driver ☐

DRIVER 4

Driver's Name: Last | First | Middle | Phone

Address: No. | Street | City | State | ZIP

Birth date: Mo. Da. Yr. | Age | Race | Sex | Occupation | Employer/School

CODE Page 1 | Lap belt | Shoulder harness | Head restraint | Ejected? | Injury severity | Yrs. driving experience

Nature and extent of injuries | Removed to, by:

DRIVER LICENSE | State | Type

No.

Expir. date

Soc. Sec. No. (if no license)

RESTRICTIONS | Valid

	On license	Yes 1	No 0
None ☐ 0	☐	☐	☐
CODED Copy from license	☐	☐	☐
	☐	☐	☐
WRITTEN Note in margin	☐ 1	☐	☐

CIRCUMSTANCES

PRIOR TO COLLISION

Dr. 3 headed ☐ N ☐ E ☐ S ☐ W on ______________ at ______

Dr. 4 headed ☐ N ☐ E ☐ S ☐ W on ______________ at ______

SPEEDS—Driver stated | Est'd | Posted

and INTENDED to

	3	4	
Go straight, follow roadway	☐	☐	A
Change lane or overtake	☐	☐	B
Slow or stop	☐	☐	C
Remain stopped in traf. lane	☐	☐	D
Start forward from stop/park	☐	☐	E
Back up from stop/park	☐	☐	F

	3	4	
Turn left	☐	☐	G
Turn right	☐	☐	H
Turn U	☐	☐	J
Remain parked	☐	☐	K
______	☐	☐	L
Other (specify)			

	3	4	
______	☐	☐	L
______	☐	☐	L
Other (specify)			

☐☐ | 3 ☐ 4 ☐

DRIVER ACTION
apparently contributing

	3	4	
Illegal or unsafe speed	☐	☐	A
Impeding traffic	☐	☐	B
Following too closely	☐	☐	C
Improper overtaking	☐	☐	D
Improper turn	☐	☐	E
Improper start/stop/park	☐	☐	F

	3	4	
Traf. control viol'n—lights	☐	☐	G
Traf. control viol'n—signs	☐	☐	H
Fail to yield ROW	☐	☐	J
Drove left of center	☐	☐	K
No or improper signal	☐	☐	L
Inattention	☐	☐	M
Avoiding veh/object/ped.	☐	☐	N
None	☐	☐	P
______	☐	☐	Q
______	☐	☐	Q
Other (specify)			

POSSIBLE CONTRIB. CIRCUMSTANCES

VEHICLE DEFECTS
apparently contributing

	3	4	
None apparent	☐	☐	A
Brakes	☐	☐	B
Headlights	☐	☐	C
Tail lights	☐	☐	D
Brake (stop) lights	☐	☐	E
Turn lights	☐	☐	F
Windshield wiper	☐	☐	G
Tires—flat	☐	☐	H
Tires—worn	☐	☐	J
Steering	☐	☐	K
	☐	☐	L
Modified vehicle ______	☐	☐	M

VISIBILITY

	Driver 3	Driver 4	Ped	
Vision not obscured	☐	☐	☐	0
Vision obscured by:				
Rain, snow, fog, etc.	☐	☐	☐	1
Windshield or car loading	☐	☐		2
Trees, signs, fixed objects	☐	☐	☐	3
Parked/moving vehicles	☐	☐	☐	4
Blinding headlights, sun	☐	☐	☐	5
Darkness	☐	☐	☐	6
______	☐	☐	☐	7
______	☐	☐	☐	7
Other (specify)				

CONDITION PRIOR

	Driver 3	Driver 4	Ped	
Physical defect	☐	☐	☐	1
Ill	☐	☐	☐	2
Fatigued	☐	☐	☐	3
Apparently asleep	☐	☐	☐	4
Apparently normal	☐	☐	☐	5
Had apparently used:				
Medication	☐	☐	☐	6
Prescription drugs	☐	☐	☐	7
Illegal drugs/narcotics	☐	☐	☐	8
Alcohol	☐	☐	☐	9
______	☐	☐	☐	0
Other (specify)				

Complete if 'Alcohol' checked in CONDITION PRIOR section

ALCOHOL INTAKE

	Driver 3	Driver 4	Ped	
Accident factor (AF)	☐	☐	☐	1
No accident factor	☐	☐	☐	2
Unknown whether AF	☐	☐	☐	3

COORDINATION TEST

	Driver 3	Driver 4	Ped	
Not given	☐	☐	☐	0
Given at: Accident	☐	☐	☐	1
Other ______	☐	☐	☐	2
Conclusion—Ability to drive/walk				
Not impaired	☐	☐	☐	0
Impaired	☐	☐	☐	1

CHEM. TEST RESULTS

Type code: Refused—R, Breath—B, Blood—L, Urine—U, Saliva—S, No test—N

Driv. | Type Test | BAL

3 ______ .0 ______

4 ______ .0 ______

Ped ______ .0 ______

Refusal Notice to DOV ☐

PEDESTR'N/PEDALCYC

For pedestrian accidents also check 5 data elements above 4 Visibility, condition, alcohol 4 coordination, chemical test ☐ 4 4 4 ☐ See CODES ☐

NAME & ADDRESS: Last | First | Middle | No. | Street | City | State | ZIP | Sex | Date of birth | Age | Inj. Sev.

Pedestrian was going ☐ N ☐ E ☐ S ☐ W } ☐ along ☐ across or into | Street, highway no. | from | to

Nature and extent of injuries

ACTIONS PRIOR

Crossing at intersection, X-walk, with signal	☐	1
Crossing not at inters'n/X-walk, or against signal	☐	2
Walking/standing in roadway on ______ side	☐	3
Playing in roadway	☐	4
Other activity in roadway ______	☐	5
Off roadway	☐	6
Not stated (unknown)	☐	7

CLOTHING COLOR WAS

____

______________________ with

No or little contrast with background —probably contributing factor (C.F.)	☐	1
Good contrast with background —probably not C.F.	☐	2
Unknown whether clothing color a C.F.	☐	3

Taken to: ______________________

By: ______________________

EXTERNAL VEHICLE FEATURES of striking vehicle contributing to injury severity

None	☐	0	
Possibly	☐	1	Explain
Probably	☐	2	
Unknown	☐	3	

MICROFILMED FROM
BEST AVAILABLE COPY

DEPARTMENT OF EMERGENCY MEDICAL TRAINING
MOTORCYCLE TRAUMA STUDY

DATE __________ CITY ________________ COUNTY ____________________

STATUS: DRIVER PASSENGER DATE OF BIRTH ______________ SEX ____

GENERAL BODY SCORE

0 1 2 3 4 5 6 ______

HEAD

0 1 2 3 4 5 6 ______

CERVICAL SPINE

0 1 2 3 4 5 6 ______

CHEST & THORACIC SPINE

0 1 2 3 4 5 6 ______

ABDOMEN & LUMBAR SPINE

0 1 2 3 4 5 6 ______

EXTREMITIES & PELVIS

0 1 2 3 4 5 6 ______

SOURCE ______________________________ TOTAL SCORE ________

E.R. PHYSICIAN ____________________ ADMITTED? YES NO

SURGERY? YES NO NAME OF SURGEON ____________________

PROCEDURE ____

ASSISTANT ________________ ANESTHIOLOGIST ________________

OTHER PHYSICIAN WHO SAW VICTIM ____________________

OTHER DETAILS:

HOSPITAL NAME ____________________ $ __________

PHYSICIAN EXPENSE ____________________ $ __________
(NAME)

____________________ $ __________

____________________ $ __________

DISABILITY DATE __________ TO __________ $ __________

WAS VICTIM WEARING A HELMET? YES NO

WAS HELMET RETAINED DURING ACCIDENT YES NO

DEMOGRAPHIC INFORMATION

MOTORCYCLE DRIVER

Name of Victim ____________________ Age ______ Sex __________

Date of Accident __________ Day ________ Time of Day __________

Location of Accident ____________________ Occupation of Victim __________

Experience (yrs) ________ Instruction: YES NO

Type of Accident: Non-collision ______ Collision-vehicle ______

Collision other than vehicle: ____________________

Charges filed: Motorcycle operator Yes No ____________________

Charges filed: Other Vehicle operator Yes No ____________________

Alcohol: Yes No Unknown Vehicle Damage Est'd # ____________________

Type of Roadway: Concrete Blacktop Brick Gravel Dirt Intersection

Road Surface Condition: Dry Wet Snow/Ice Unknown

Weather: Clear Cloudy Raining Snow/Sleet Fog

Light Condition: Daylight Dawn/Dusk Dark Unknown

Helmet Use: YES NO Helmet Retained: YES NO

Helmet Damaged: YES NO Helmet Approved: Yes No

Eye Protection Use: Yes No Unknown Eye Protection Damaged: Yes No

Patient Scoring

Hospital ____________________ City ____________________

E.R. Physician ____________________ Admitted? Yes No

Injury Scoring

General Body Score	0	1	2	3	4	5	6	__________
Head	0	1	2	3	4	5	6	
Cervical Spine	0	1	2	3	4	5	6	
Chest and Thoracic Spine	0	1	2	3	4	5	6	
Abdomen and Lumbar Spine	0	1	2	3	4	5	6	
Extremities and Pelvis	0	1	2	3	4	5	6	
Total Score:								

DEMOGRAPHIC INFORMATION

MOTORCYCLE PASSENGER

Name of Victim ____________________ Age ______ Sex ____________

Date of Accident ____________ Day ________ Time of Day ____________

Location of Accident ____________________ Occupation of Victim ____________

Experience (yrs) ________ Instruction: YES NO

Type of Accident: Non-collision ______ Collision-vehicle ______

Collision other than vehicle: ____________________

Charges filed: Motorcycle operator Yes No ____________________

Charges filed: Other Vehicle operator Yes No ____________________

Alcohol: Yes No Unknown Vehicle Damage Est'd # ____________

Type of Roadway: Concrete Blacktop Brick Gravel Dirt Intersection

Road Surface Condition: Dry Wet Snow/Ice Unknown

Weather: Clear Cloudy Raining Snow/Sleet Fog

Light Condition: Daylight Dawn/Dusk Dark Unknown

Helmet Use: YES NO Helmet Retained: YES NO

Helmet Damaged: YES NO Helmet Approved: Yes No

Eye Protection Use: Yes No Unknown Eye Protection Damaged: Yes No

Patient Scoring

Hospital ____________________ City ____________________

E.R. Physician ____________________ Admitted? Yes No

Injury Scoring

General Body Score	0	1	2	3	4	5	6	____________
Head	0	1	2	3	4	5	6	
Cervical Spine	0	1	2	3	4	5	6	
Chest and Thoracic Spine	0	1	2	3	4	5	6	
Abdomen and Lumbar Spine	0	1	2	3	4	5	6	
Extremities and Pelvis	0	1	2	3	4	5	6	
Total Score:								

HELMET USE STUDY

TIME IN ______ TIME OUT ______ LOCATION URBAN
RURAL ______________________________

DAY OF WEEK __________________ WEATHER CONDITIONS CLEAR MOSTLY CLOUDY RAIN

TIME	CYCLE SIZE	DRIVER SEX		PASSENGER SEX		DRIVER HELMET				PASSENGER HELMET				DRIVER VISION				PASSENGER VISION				OUT-STATE	[illegible]
		MALE	FEMALE	MALE	FEMALE	FULL	3/4	1/2	NONE	FULL	3/4	1/2	NONE	VISOR	GOGGLES	GLASSES	NONE	VISOR	GOGGLES	GLASSES	NONE		

APPENDIX B

PROJECT TASK DEFINITIONS

Tables B-1, B-2, B-3 and B-4 illustrate the origional schedule of completion of tasks within this study. At the time this work plan was completed, there were no plans to complete any data processing at the University of Kansas. This initial plan called for the accumulation of data by the Emergency Medcial Training Program, and the transmission of this data to DOT/NHTSA for analysis. On January 18, 1978, during a site visit by the two DOT/NHTSA contract officers, the Emergency Medical Training Program was requested to develop a contract modification to provide for data processing at the University of Kansas College of Health Sciences. An extension of the contract and addition of funds to cover expenses incurred in this additional task were not granted until September, 1978. As a result, no task schedule or work plan was developed for this activity. Since the extension of the contract to provide for data processing, an additional extension, through August 31, 1979 has been negotiated, and completed, in order to add additional data, including the years 1977 and 1978, as well as the addition of an estimate of economic impact of motorcycle accidents during the 1977 and 1978 study time frames.

TABLE B-1

ANNUAL WORK PROGRAM

FY 77

ORGANIZATION ENTITY Kansas University Medical Center Emergency Medical Training

OBJECTIVE NUMBER I

OBJECTIVE STATEMENT To collect motorcycle accident data from law enforcement authorities for July, August and September of 1975 and July, August, and September, 1976.

RESOURCES:			
PERSON DAYS (220/YR)	AGENCY	OTHER	TOTAL
A. PROFESSIONAL			
B. SUPPORT			
TOTAL			
TRAVEL $			
CONTRACTS $			
OTHER $			
TOTAL $			

LAST DATE REVISED

OTHER ACTION	AGENCY ACTION	MILESTONE & ACTION STEP	MILESTONE (Δ)/Action Steps (Δ)	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
	KUMC-EMT	1.0	Recruit and train a suitable research assistant for full-time employment during the period of this project.								X				
KHP		1.1	Obtain copies of all motorcycle accident report forms from Kansas Highway Patrol for the period July, August, and September of 1975; and the period of July, August and September of 1976.								x	X			
	KUMC-EMT	1.2	To compile the accident forms according to the location of accidents. These will be divided into four categories: 1. The greater Kansas City municipal area. 2. The greater Topeka municipal area. 3. The greater Wichita municipal area. 4. The balance of the state of Kansas.								x	x	X		
	KUMC-EMT	1.3	In the case of incomplete accident report forms, contact will be made with specific law enforcement agencies, appropriate ambulance/rescue services, the health care providers or institutions, or if possible, the accident victims, in order to complete necessary data.									x	X		

B-3

TABLE B-2

ANNUAL WORK PROGRAM

FY 1977

RESOURCES:			
PERSON DAYS (220/YR)	AGENCY	OTHER	TOTAL
A. PROFESSIONAL			
B. SUPPORT			
TOTAL			
TRAVEL $			
CONTRACTS $			
OTHER $			
TOTAL $			

LAST DATE REVISED ____

ORGANIZATION ENTITY Kansas University Medical Center Emergency Medical Training

OBJECTIVE NUMBER II

OBJECTIVE STATEMENT Determine the frequency and severity of injuries to specific body areas sustained in accidents involving motorcycle riders.

OTHER ACTION	AGENCY ACTION	MILESTONE & ACTION STEP	MILESTONE (Δ)/Action Steps (Δ)	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
	KUMC-EMT	2.0	Recruit and train one part-time research assistant to be located in Wichita, Kansas, and one part-time research assistant to be located in Topeka, Kansas								x	X			
	KUMC-EMT	2.1	Develop a short form to utilize the Abbreviated Injury Scale (AIS) to determine the location and extent of each injury suffered by those subjects involved in motorcycle accidents.								x	x	X		
	KUMC-EMT	2.2	Supervise the research assistants as they examine the medical records of those individuals identified in 2.1 in locations #1, #2 and #3 (see objective #1) in order to obtain all information included on the short form.									x	x	x	X
	KUMC-EMT	2.3	Contact all hospitals identified as location # 4 (see objective # 1) and obtain their cooperation in completion of the short forms. Whenever necessary, direct contact by a research assistant will be carried out.									x	x	x	X
	KUMC-EMT	2.4	Examine all completed short forms in order to identify those cases that require direct physician contact.											x	X

GSA-NC-74-03375

TABLE B-3

ANNUAL WORK PROGRAM

FY 1977

RESOURCES:			
PERSON DAYS (220/YR.)	AGENCY	OTHER	TOTAL
A. PROFESSIONAL			
B. SUPPORT			
TOTAL			
TRAVEL $			
CONTRACTS $			
OTHER $			
TOTAL $			

ORGANIZATION ENTITY Kansas University Medical Center Emergency Medical Training

OBJECTIVE NUMBER III

OBJECTIVE STATEMENT Compare and contrast specific numbers and categories of injuries sustained by those involved in motorcycle accidents during the two time periods specified in Objective # 1.

LAST DATE REVISED

OTHER ACTION	AGENCY ACTION	MILESTONE & ACTION STEP	MILESTONE (Δ) / Action Steps (Δ)	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
	KUMC-EMT	3.0	Examine each accident form and develop two categories, based on useage or non-useage of motorcycle helmets.												X
	KUMC-EMT	3.1	Make appropriate contact in order to complete those forms which are found to be incomplete.	X											x
	KUMC-EMT	3.2	Develop categories of injury, with emphasis on head trauma within each of the subject groups mentioned in objective 3.0.	x	x	X									
	KUMC-EMT	3.3	Compare and contrast the categories determined in section 3.0 and 3.2 for the time periods July, August, and September, 1975, and July, August, and September, 1976				x	x	X						
	KUMC-EMT	3.4	Provide direct contact in those specific cases where data appears to be incomplete.				x	x	X						

B5

TABLE B-4

ANNUAL WORK PROGRAM

FY 1977

RESOURCES:			
PERSON DAYS (220/YR.)	AGENCY	OTHER	TOTAL
A. PROFESSIONAL			
B. SUPPORT			
TOTAL			
TRAVEL $			
CONTRACTS $			
OTHER $			
TOTAL $			

ORGANIZATION ENTITY Kansas University Medical Center Emergency Medical Training

OBJECTIVE NUMBER IV

OBJECTIVE STATEMENT Determine current helmet useage through observational surveys on selected roadways in appropriate settings.

LAST DATE REVISED ____________

OTHER ACTION	AGENCY ACTION	MILESTONE & ACTION STEP	MILESTONE (Δ)/Action Steps (Δ)	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
	KUMC-EMT	4.0	Following compilation of origional data regarding location of motorcycle accidents, locations will be selected for a survey to determine the use of approved motorcycle helmets in both urban and rural settings within the state of Kansas	x	X										x
	KUMC-EMT	4.1	Data will be compiled and the percentage of motorcycle helmet useage will be determined for the survey period	x	X										x

APPENDIX C

AUTOMATED DATA FORMAT AND CODING DEFINITIONS

LOCATION	LENGTH	CONTENTS
1 - 4	4	Accident Report Number
5	1	Report suffix number 1 = more than one motorcycle blank = one motorcycle
6 - 7	2	State Code (KS = Kansas)
8	1	County identifier 1 = Johnson 2 = Wyandotte 3 = Douglas 4 = Shawnee 5 = Sedgwick
9 - 10	2	City/Town identifier 1 = Overland Park 2 = Kansas City, Kansas 3 = Lenexa 4 = Roeland Park 5 = Lawrence 6 = Prarie Village 7 = Shawnee 8 = Merriam 9 = Westwood 10 = Olathe 11 = Topeka 12 = Wichita 13 = Haysville 14 = Leawood 15 = Andale 16 = Lake Quivera 17 = Mission 18 = Desoto 19 = Valley Center 20 = Fairway 21 = Bonner Springs
11 - 14	4	Reporting police agency OPPD = Overland Park Police Deptartment KCKP = Kansas City, Ks., Police Dept. LXPD = Lenexa Police Department RPPD = Roeland Park Police Department LPD = Lawrence Police Departmen PVPD = Prarie Village Police Dept. SPD = Shawnee Police Dept KSHP = Kansas Highway Patrol MRPD = Merriam Police Department

LOCATION	LENGTH	CONTENTS
		Reporting police agency (Continued) WWPD = Westwood Police Department JCSP = Johnson Co. Sherrif's Patrol OPD = Olathe Police Department TPD = Topeka Police Department SNSD = Shawnee Co. Sherrif's Dept. WPD = Wichita Police Department SCSD = Sedgwick Co. Sherrif's Dept. HVPD = Haysville Police Department LWPD = Leawood Police Department SCLP = Sedgwick Co. Lake Patrol MPD = Mission Police Department WYSP = Wyandotte Co. Sherrif's Patrol KUPD = University of Ks. Police Dept. SCPP = Shawnee Co. Park Patrol VCPD = Valley Center Police Department FWPD = Fairway Police Department BSPD = Bonner Springs Police Department APSW = Airport Security Div. - Wichita DGSD = Douglas Co. Sherrif's Dept.
15	1	Accident Location 1 = Rural 2 = Urban
16 - 21	6	Date of Accident (MMDDYY)
22	1	1 = Sunday .... 7 = Saturday
23 - 26	4	Time of accident (to nearest hour, 0100 - 2400)
27 - 29	3	Estimated speed
30	1	Accident Classification 1 = Traffic 2 = Non-traffic
31 - 32	2	Motorcycle model year (last two digits)
33 - 35	3	Driver Experience in months
36	1	Number of riders, including driver
37	1	Rider position 1 = driver 2 = passenger
38	1	1st injury location 1 = general body 2 = head and face 3 = neck 4 = chest 5 = abdomen 6 = extremities

LOCATION	**LENGTH**	**CONTENT**
39	1	Second Injury
40	1	Third Injury
41	1	Fourth Injury
42	1	Fifth Injury
43	1	Sixth Injury
44	1	Safety helmet use 1 = yes 2 = no 3 = unknown
45	1	Safety helmet type 1 = full 2 = partial 3 = half 4 = unknown
46	1	Helmet ejection 1 = yes 2 = no 3 = unknown
47	1	Evidence of helmet contact or damage 1 = yes 2 = no 3 = unknown
48 - 49	2	Rider age in years
50	1	Rider's sex 1 = male 2 = female 3 = unknown
51	1	Most severy injury location 1 = general body 2 = head and face 3 = neck 4 = chest 5 = abdomen 6 = extremities
52	1	Severity of most severe injury 0 = no injury 1 = Minor injury 2 = Moderate injury 3 = Severe injury 4 = Serious injury 5 = Critical injury 6 = Maximum injury

LOCATION	LENGTH	CONTENT
53	1	Second most severe injury location
54	1	Second most severe injury AIS score
55	1	Third most severe injury location
56	1	Third most severe injury AIS score
57	1	Fatality code
58 - 78	21	Data on second rider (if applicable)

APPENDIX D

DISTRIBUTION OF DATA ELEMENTS
BOTH YEARS COMBINED

CONTENT **PAGE**

NUMBER OF MOTORCYCLES INVOLVED IN ACCIDENTS D-2
STATE CODE D-2
COUNTY IDENTIFIER D-2
CITY - TOWN D-2
LAW ENFORCEMENT AGENCY REPORTING MOTORCYCLE ACCIDENT D-3
ACCIDENT LOCATION D-3
ACCIDENTS BY YEAR D-3
DAY OF WEEK D-4
TIME OF ACCIDENT D-4
ESTIMATED SPEED JUST PRIOR TO ACCIDENT D-4
ACCIDENT CLASSIFICATION D-5
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DRIVER EXPERIENCE IN MONTHS D-5
NUMBER OF RIDERS INCLUDING DRIVER D-5
RIDER POSITION D-6
FIRST INJURY LOCATION D-6
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SEX OF RIDER D-8
MOST SEVERE INJURY LOCATION D-8
SEVERITY OF THE MOST SEVERE INJURY D-8
SECOND MOST SEVERE INJURY LOCATION D-8
SEVERITY OF THE SECOND MOST SEVERE INJURY D-8
THIRD MOST SEVERE INJURY LOCATION D-9
SEVERITY OF THE THIRD MOST SEVERE INJURY D-9
FATALITY CODE D-9

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                                  S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                  COL5   FREQUENCY   CUM FREQ   PERCENT   CUM PERCENT

NUMBER OF CYCLES INVOLVED            .         715          .         .             .
IN ACCIDENTS                         1          21         21   100.000       100.000
-----------------------------------------------------------------------------------------
                                COL6_7   FREQUENCY   CUM FREQ   PERCENT   CUM PERCENT

STATE CODE                          KS         736        736   100.000       100.000
-----------------------------------------------------------------------------------------
                                  COL8   FREQUENCY   CUM FREQ   PERCENT   CUM PERCENT

COUNTY IDENTIFIER                    .           2          .         .             .
JOHNSON    . . . . . . .             1         132        132    17.984        17.984
WYANDOTTE  . . . . . . .             2         169        301    23.025        41.008
DOUGLAS    . . . . . . .             3          44        345     5.995        47.003
SHAWNEE    . . . . . . .             4         100        445    13.624        60.627
SEDGWICK   . . . . . . .             5         289        734    39.373       100.000
-----------------------------------------------------------------------------------------
                               COL9_10   FREQUENCY   CUM FREQ   PERCENT   CUM PERCENT

CITY-TOWN                            .          44          .         .             .
OVERLAND PARK      . . . . .         1          36         36     5.202         5.202
KANSAS CITY, KS.   . . . . .         2         165        201    23.844        29.046
LENEXA     . . . . . . .             3          16        217     2.312        31.358
ROELAND PARK . . . . . .             4           5        222     0.723        32.081
LAWRENCE   . . . . . . .             5          38        260     5.491        37.572
PRARIE VILLAGE     . . . . .         6           4        264     0.578        38.150
SHAWNEE    . . . . . . .             7          25        289     3.613        41.763
MERRIAM    . . . . . . .             8           9        298     1.301        43.064
WESTWOOD   . . . . . . .             9           2        300     0.289        43.353
OLATHE     . . . . . . .            10          10        310     1.445        44.798
TOPEKA     . . . . . . .            11          97        407    14.017        58.815
WICHITA    . . . . . . .            12         268        675    38.728        97.543
HAYSVILLE  . . . . . . .            13           2        677     0.289        97.832
LEAWOOD    . . . . . . .            14           3        680     0.434        98.266
ANDALE     . . . . . . .            15           1        681     0.145        98.410
LAKE QUIVERA . . . . . .            16           1        682     0.145        98.555
MISSION    . . . . . . .            17           6        688     0.867        99.422
DESOTO     . . . . . . .            18           1        689     0.145        99.566
VALLEY CENTER  . . . . .            19           2        691     0.289        99.855
BONNER SPRINGS     . . . .          21           1        692     0.145       100.000
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                              S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                              COL11_14   FREQUENCY   CUM FREQ   PERCENT   CUM PERCENT

                                                13
                                                           .          .             .
LAW ENFORCEMENT               APSW              1          1      0.138         0.138
AGENCIES REPORTING            BSPD              1          2      0.138         0.277
MOTORCYCLE ACCIDENTS          DGSD              2          4      0.277         0.553
                              FWPD              2          6      0.277         0.830
(KEY ON PAGES C-1             HVPD              2          8      0.277         1.107
 AND C-2)                     JCSP             13         21      1.798         2.905
                              KCKP            151        172     20.885        23.790
                              KSHP             30        202      4.149        27.939
                              KUPD              3        205      0.415        28.354
                              LPD              34        239      4.703        33.057
                              LWPD              3        242      0.415        33.472
                              LXPD             12        254      1.660        35.131
                              MPD               6        260      0.830        35.961
                              MPPD              1        261      0.138        36.100
                              MRPD              8        269      1.107        37.206
                              OPD               9        278      1.245        38.451
                              OPPD             34        312      4.703        43.154
                              PVPD              4        316      0.553        43.707
                              RPPD              4        320      0.553        44.260
                              SCLP              1        321      0.138        44.398
                              SCPP              1        322      0.138        44.537
                              SCSD             37        359      5.118        49.654
                              SNSD             14        373      1.936        51.591
                              SPD              24        397      3.320        54.910
                              TPD              83        480     11.480        66.390
                              VCPD              2        482      0.277        66.667
                              WPD             236        718     32.642        99.308
                              WWPD              2        720      0.277        99.585
                              WYSP              2        722      0.277        99.862
                              ZPD               1        723      0.138       100.000

                                 COL15    FREQUENCY   CUM FREQ   PERCENT   CUM PERCENT
ACCIDENT LOCATION
RURAL  . . . . . . .               1          51          51      6.929         6.929
URBAN  . . . . . . .               2         685         736     93.071       100.000

                              COL20_21    FREQUENCY   CUM FREQ   PERCENT   CUM PERCENT

ACCIDENTS BY YEAR                 75         351         351     47.690        47.690
                                  76         385         736     52.310       100.000
                              S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                  COL22   FREQUENCY  CUM FREQ   PERCENT  CUM PERCENT

DAY OF WEEK                         .           2         .         .          .
SUNDAY  .  .  .  .  .  .  .         1          97        97    13.215     13.215
MONDAY  .  .  .  .  .  .  .         2          79       176    10.763     23.978
TUESDAY .  .  .  .  .  .  .         3          98       274    13.351     37.330
WEDNESDAY   .  .  .  .  .  .        4          99       373    13.488     50.817
THURSDAY    .  .  .  .  .  .        5          97       470    13.215     64.033
FRIDAY  .  .  .  .  .  .  .         6         132       602    17.984     82.016
SATURDAY .  .  .  .  .  .  .        7         132       734    17.984    100.000
--------------------------------------------------------------------------------------
                               COL23_26   FREQUENCY  CUM FREQ   PERCENT  CUM PERCENT

TIME OF ACCIDENT
(MILITARY TIME)                     .           1         .         .          .
                                  100          23        23     3.129      3.129
                                  200           8        31     1.088      4.218
                                  300          13        44     1.769      5.986
                                  400           3        47     0.408      6.395
                                  500           2        49     0.272      6.667
                                  600           5        54     0.680      7.347
                                  700          18        72     2.449      9.796
                                  800          27        99     3.673     13.469
                                  900          14       113     1.905     15.374
                                 1000          18       131     2.449     17.823
                                 1100          27       158     3.673     21.497
                                 1200          38       196     5.170     26.667
                                 1300          35       231     4.762     31.429
                                 1400          36       267     4.898     36.327
                                 1500          46       313     6.259     42.585
                                 1600          63       376     8.571     51.156
                                 1700          71       447     9.660     60.816
                                 1800          59       506     8.027     68.844
                                 1900          56       562     7.619     76.463
                                 2000          43       605     5.850     82.313
                                 2100          28       633     3.810     86.122
                                 2200          35       668     4.762     90.884
                                 2300          31       699     4.218     95.102
                                 2400          36       735     4.898    100.000
--------------------------------------------------------------------------------------
                               COL27_29   FREQUENCY  CUM FREQ   PERCENT  CUM PERCENT

ESTIMATED SPEED JUST
PRIOR TO ACCIDENT                   .         155         .         .          .
                                    0          30        30     5.164      5.164
 1 to 15 MPH   .  .  .  .  .  .     1          76       106    13.081     18.244
16 to 30 MPH   .  .  .  .  .  .     2         178       284    30.637     48.881
31 to 45 MPH   .  .  .  .  .  .     3         230       514    39.587     88.468
46 to 60 MPH   .  .  .  .  .  .     4          58       572     9.983     98.451
More than 61 MPH  .  .  .  .  .     5           9       581     1.549    100.000
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                         S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                COL30     FREQUENCY   CUM FREQ    PERCENT    CUM PERCENT
ACCIDENT CLASSIFICATION

                                  .           5           .           .            .
TRAFFIC  . . . . . . . . . . .    1         439         439      66.895       66.895
NON-TRAFFIC  . . . . . . . . .    2         242         731      33.105      100.000
----------------------------------------------------------------------------------------
                              COL31_32    FREQUENCY   CUM FREQ    PERCENT    CUM PERCENT
MOTORCYCLE MODEL YEAR
                                  .          21           .           .            .
                                 48           1           1       0.140        0.140
                                 50           1           2       0.140        0.280
                                 53           1           3       0.140        0.420
                                 54           1           4       0.140        0.559
                                 58           1           5       0.140        0.699
                                 59           2           7       0.280        0.979
                                 61           2           9       0.280        1.259
                                 62           2          11       0.280        1.538
                                 63           3          14       0.420        1.958
                                 64           4          18       0.559        2.517
                                 65           4          22       0.559        3.077
                                 66           9          31       1.259        4.336
                                 67          10          41       1.399        5.734
                                 68           8          49       1.119        6.853
                                 69          15          64       2.098        8.951
                                 70          39         103       5.455       14.406
                                 71          72         175      10.070       24.476
                                 72         117         292      16.364       40.839
                                 73         126         418      17.622       58.462
                                 74         132         550      18.462       76.923
                                 75         117         667      16.364       93.287
                                 76          48         715       6.713      100.000
----------------------------------------------------------------------------------------

DRIVER EXPERIENCE             COL33_35    FREQUENCY   CUM FREQ    PERCENT    CUM PERCENT
IN MONTHS
                                  .         276           .           .            .
LESS THAN 1 MONTH  . . . .        1          13          13       2.826        2.826
1 to 3 MONTHS  . . . . . .        2           3          16       0.652        3.478
4 to 6 MONTHS  . . . . . .        3           5          21       1.087        4.565
7 to 12 MONTHS . . . . . .        4          37          58       8.043       12.609
13 to 24 MONTHS . . . . .         5          35          93       7.609       20.217
25 to 48 MONTHS . . . . .         6          73         166      15.870       36.087
49 to 96 MONTHS . . . . .         7         142         308      30.870       66.957
MORE THAN 96 MONTHS . . . .       8         152         460      33.043      100.000
----------------------------------------------------------------------------------------

NUMBER OF RIDERS              COL36       FREQUENCY   CUM FREQ    PERCENT    CUM PERCENT
INCLUDING DRIVER
                                  .           3           .           .            .
ONE  . . . . . . . . . . .        1         589         589      80.355       80.355
TWO  . . . . . . . . . . .        2         144         733      19.645      100.000
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                              S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                              CCL37   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT
RIDER POSITION

                                  .          11          .          .             .
DRIVER . . . . . . . . . . . . .  1         723        723     86.587        86.587
PASSENGER  . . . . . . . . . . .  2         111        834     13.293        99.880
SECOND PASSENGER . . . . . . . .  4           1        835      0.120       100.000
-----------------------------------------------------------------------------------
FIRST INJURY LOCATION         CCL38   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT

                                  .         517          .          .             .
GENERAL BODY . . . . . . . . . .  1         304        304     92.401        92.401
HEAD AND FACE  . . . . . . . . .  2           6        310      1.824        94.225
NECK . . . . . . . . . . . . . .  3           1        311      0.304        94.529
ABDOMEN  . . . . . . . . . . . .  5           2        313      0.608        95.137
EXTREMITIES  . . . . . . . . . .  6          16        329      4.863       100.000
-----------------------------------------------------------------------------------
SECOND INJURY LOCATION        CCL39   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT

                                  .         627          .          .             .
GENERAL BODY . . . . . . . . . .  1           2          2      0.913         0.913
HEAD AND FACE  . . . . . . . . .  2         107        109     48.858        49.772
NECK . . . . . . . . . . . . . .  3           7        116      3.196        52.968
CHEST  . . . . . . . . . . . . .  4          11        127      5.023        57.991
ABDOMEN  . . . . . . . . . . . .  5           9        136      4.110        62.100
EXTREMITIES  . . . . . . . . . .  6          83        219     37.900       100.000
-----------------------------------------------------------------------------------
THIRD INJURY LOCATION         CCL40   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT

                                  .         771          .          .             .
HEAD AND FACE  . . . . . . . . .  2           1          1      1.333         1.333
NECK . . . . . . . . . . . . . .  3           7          8      9.333        10.667
CHEST  . . . . . . . . . . . . .  4          17         25     22.667        33.333
ABDOMEN  . . . . . . . . . . . .  5           6         31      8.000        41.333
EXTREMITIES  . . . . . . . . . .  6          44         75     58.667       100.000
-----------------------------------------------------------------------------------
FOURTH INJURY LOCATION        CCL41   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT

                                  .         825          .          .             .
CHEST  . . . . . . . . . . . . .  4           2          2      9.524         9.524
ABDOMEN  . . . . . . . . . . . .  5           4          6     19.048        28.571
EXTREMITIES  . . . . . . . . . .  6          15         21     71.429       100.000
-----------------------------------------------------------------------------------
FIFTH INJURY LOCATION         CCL42   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT

                                  .         841          .          .             .
ABDOMEN  . . . . . . . . . . . .  5           1          1     20.000        20.000
EXTREMITIES  . . . . . . . . . .  6           4          5     80.000       100.000
```

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                         S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                COL43    FREQUENCY  CUM FREQ    PERCENT   CUM PERCENT
SIXTH INJURY LOCATION
                                  .         843         .          .           .
NECK  . . . . . . . . . . . . .   2           2         2       66.667      66.667
EXTREMITIES . . . . . . . . . .   6           1         3       33.333     100.000
-------------------------------------------------------------------------------------
SAFETY HELMET USE               COL44    FREQUENCY  CUM FREQ    PERCENT   CUM PERCENT

                                  .           5         .          .           .
YES . . . . . . . . . . . . . .   1         498       498       59.215      59.215
NO  . . . . . . . . . . . . . .   2         250       748       29.727      88.942
UNKNOWN . . . . . . . . . . . .   3          93       841       11.058     100.000
-------------------------------------------------------------------------------------
SAFETY HELMET TYPE              COL45    FREQUENCY  CUM FREQ    PERCENT   CUM PERCENT

                                  .         253         .          .           .
PARTIAL . . . . . . . . . . . .   2           2         2        0.337       0.337
UNKNOWN . . . . . . . . . . . .   4         591       593       99.663     100.000
-------------------------------------------------------------------------------------
HELMET EJECTION ?               COL46    FREQUENCY  CUM FREQ    PERCENT   CUM PERCENT

                                  .         254         .          .           .
YES . . . . . . . . . . . . . .   1          13        13        2.196       2.196
NO  . . . . . . . . . . . . . .   2         435       448       73.480      75.676
UNKNOWN . . . . . . . . . . . .   3         143       591       24.155      99.831
                                  4           1       592        0.169     100.000
-------------------------------------------------------------------------------------
HELMET DAMAGE                   COL47    FREQUENCY  CUM FREQ    PERCENT   CUM PERCENT

                                  .         252         .          .           .
YES . . . . . . . . . . . . . .   1          84        84       14.141      14.141
NO  . . . . . . . . . . . . . .   2         410       494       69.024      83.165
UNKNOWN . . . . . . . . . . . .   3          99       593       16.667      99.832
                                  5           1       594        0.168     100.000
-------------------------------------------------------------------------------------
                              COL48_49   FREQUENCY  CUM FREQ    PERCENT   CUM PERCENT
DRIVER'S AGE
                                  .          15         .          .           .
1 to 5 YEARS  . . . . . . . . .   1           5         5        0.602       0.602
6 to 10 YEARS . . . . . . . . .   2           3         8        0.361       0.963
11 to 15 YEARS  . . . . . . . .   3          30        38        3.610       4.573
16 to 20 YEARS  . . . . . . . .   4         247       285       29.723      34.296
21 to 25 YEARS  . . . . . . . .   5         269       554       32.371      66.667
26 to 30 YEARS  . . . . . . . .   6         135       689       16.245      82.912
31 to 35 YEARS  . . . . . . . .   7          60       749        7.220      90.132
36 to 40 YEARS  . . . . . . . .   8          33       782        3.971      94.103
41 to 45 YEARS  . . . . . . . .   9          20       802        2.407      96.510
46 to 50 YEARS  . . . . . . . .  10          18       820        2.166      98.676
MORE THAN 50 YEARS  . . . . . .  11          11       831        1.324     100.000
```

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                   S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                              COL50   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT

SEX OF RIDER
                                .          7          .           .           .
MALE  .  .  .  .  .  .  .  .    1        737        737      87.843      87.843
FEMALE .  .  .  .  .  .  .  .   2        100        837      11.919      99.762
UNKNOWN  .  .  .  .  .  .  .    3          1        838       0.119      99.881
                                5          1        839       0.119     100.000
-------------------------------------------------------------------------------------
MOST SEVERE                   COL51   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT
INJURY LOCATION
                                .        516          .           .           .
GENERAL BODY  .  .  .  .  .     1        106        106      32.121      32.121
HEAD AND FACE  .  .  .  .  .    2         80        186      24.242      56.364
NECK  .  .  .  .  .  .  .  .    3          6        192       1.818      58.182
CHEST  .  .  .  .  .  .  .  .   4         13        205       3.939      62.121
ABDOMEN  .  .  .  .  .  .  .    5         12        217       3.636      65.758
EXTREMITIES  .  .  .  .  .      6        113        330      34.242     100.000
-------------------------------------------------------------------------------------
SEVERITY OF THE               COL52   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT
MOST SEVERE INJURY
                                .        518          .           .           .
0 = NO INJURY  .  .  .  .  .    1        149        149      45.427      45.427
1 = MINOR INJURY  .  .  .  .    2         90        239      27.439      72.866
2 = MODERATE INJURY.  .  .  .   3         59        298      17.988      90.854
3 = SEVERE INJURY  .  .  .  .   4         10        308       3.049      93.902
4 = SERIOUS INJURY .  .  .  .   5         19        327       5.793      99.695
5 = CRITICAL INJURY  .  .  .    6          1        328       0.305     100.000
-------------------------------------------------------------------------------------
SECOND MOST SEVERE            COL53   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT
INJURY LOCATION
                                .        626          .           .           .
GENERAL BODY  .  .  .  .  .     1        137        137      62.273      62.273
HEAD AND FACE  .  .  .  .  .    2         24        161      10.909      73.182
NECK  .  .  .  .  .  .  .  .    3          6        167       2.727      75.909
CHEST  .  .  .  .  .  .  .  .   4         15        182       6.818      82.727
ABDOMEN  .  .  .  .  .  .  .    5          5        187       2.273      85.000
EXTREMITIES  .  .  .  .  .      6         33        220      15.000     100.000
-------------------------------------------------------------------------------------
SEVERITY OF THE SECOND        COL54   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT
MOST SEVERE INJURY
                                .        627          .           .           .
0 = NO INJURY  .  .  .  .  .    1        152        152      69.406      69.406
1 = MINOR INJURY  .  .  .  .    2         48        200      21.918      91.324
2 = MODERATE INJURY  .  .  .    3         10        210       4.566      95.890
3 = SEVERE INJURY  .  .  .  .   4          8        218       3.653      99.543
5 = CRITICAL INJURY.  .  .  .   6          1        219       0.457     100.000
```

```
                          S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                  COL55   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT
THIRD MOST SEVERE
INJURY LOCATION
                                    .        771          .          .            .
GENERAL BODY . . . . . . . . .      1         48         48     64.000       64.000
HEAD AND FACE  . . . . . . . .      2          7         55      9.333       73.333
NECK   . . . . . . . . . . . .      3          3         58      4.000       77.333
CHEST  . . . . . . . . . . . .      4          2         60      2.667       80.000
ABDOMEN  . . . . . . . . . . .      5          2         62      2.667       82.667
EXTREMITIES  . . . . . . . . .      6         13         75     17.333      100.000
---------------------------------------------------------------------------------------
SEVERITY OF THE THIRD             COL56   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT
MOST SEVERE INJURY
                                    .        773          .          .            .
0 = NO INJURY  . . . . . . . .      1         50         50     68.493       68.493
1 = MINOR INJURY . . . . . . .      2         16         66     21.918       90.411
2 = MODERATE INJURY  . . . . .      3          5         71      6.849       97.260
3 = SEVERE INJURY  . . . . . .      4          2         73      2.740      100.000
---------------------------------------------------------------------------------------
                                  COL57   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT
FATALITY CODE
                                    .        828          .          .            .
                                    1         18         18    100.000      100.000

                               COL20_21   FREQUENCY   CUM FREQ    PERCENT   CUM PERCENT

                                   75        398        398     47.045       47.045
                                   76        448        846     52.955      100.000
```

APPENDIX E

DISTRIBUTION OF DATA ELEMENTS
1976 AND 1976

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NUMBER OF CYCLES
INVOLVED IN THE ACCIDENT

```
S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                TABLE OF COL5 BY COL20_21

COL5          COL20_21

FREQUENCY|
 PERCENT |
 ROW PCT |
 COL PCT |      75|      76|  TOTAL
---------+--------+--------+
    .    |    342 |    373 |      .
         |      . |      . |      .
---------+--------+--------+
         |      . |      . |
         |      . |      . |
---------+--------+--------+
    1    |      9 |     12 |     21
         |  42.86 |  57.14 | 100.00
         |  42.86 |  57.14 |
         | 100.00 | 100.00 |
---------+--------+--------+
TOTAL           9       12       21
            42.86    57.14   100.00
```

```
                                     S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                                   TABLE OF COL6_7 BY COL20_21

                                         COL6_7        COL20_21

                                         FREQUENCY|
                                          PERCENT |
                                          ROW PCT |
                                          COL PCT |       75|       76|  TOTAL
                                         ---------+---------+---------+
                                         KS       |    351  |    385  |    736
                                                  |  47.69  |  52.31  | 100.00
                                                  |  47.69  |  52.31  |
                                                  | 100.00  | 100.00  |
                                         ---------+---------+---------+
                                         TOTAL         351       385      736
                                                     47.69     52.31   100.00
```

STATE CODE

```
                          S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                      TABLE OF COL8 BY COL20_21

                           COL8          COL20_21
COUNTY IDENTIFIER
                           FREQUENCY|
                           PERCENT  |
                           ROW PCT  |
                           COL PCT  |      75|      76|  TOTAL
                           ---------+--------+--------+
                                .   |      2 |      0 |      .
                                    |      . |      . |      .
                                    |      . |      . |
                                    |      . |      . |
                           ---------+--------+--------+
JOHNSON . . . . . . . .  1          |     66 |     66 |    132
                                    |   8.99 |   8.99 |  17.98
                                    |  50.00 |  50.00 |
                                    |  18.91 |  17.14 |
                           ---------+--------+--------+
WYANDOTTE . . . . . . .  2          |     80 |     89 |    169
                                    |  10.90 |  12.13 |  23.02
                                    |  47.34 |  52.66 |
                                    |  22.92 |  23.12 |
                           ---------+--------+--------+
DOUGLAS . . . . . . . .  3          |     19 |     25 |     44
                                    |   2.59 |   3.41 |   5.99
                                    |  43.18 |  56.82 |
                                    |   5.44 |   6.49 |
                           ---------+--------+--------+
SHAWNEE . . . . . . . .  4          |     46 |     54 |    100
                                    |   6.27 |   7.36 |  13.62
                                    |  46.00 |  54.00 |
                                    |  13.18 |  14.03 |
                           ---------+--------+--------+
SEDGWICK . . . . . . . . 5          |    138 |    151 |    289
                                    |  18.80 |  20.57 |  39.37
                                    |  47.75 |  52.25 |
                                    |  39.54 |  39.22 |
                           ---------+--------+--------+
                           TOTAL         349      385      734
                                       47.55    52.45   100.00
```

```
                                   S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                              TABLE OF COL9_10 BY COL20_21

                                   COL9_10       COL20_21
CITY - TOWN
                                   FREQUENCY|
                                    PERCENT |
                                    ROW PCT |
                                    COL PCT |       75|       76|  TOTAL
                                   ---------+---------+---------+
                                          . |      21 |      23 |      .
                                            |       . |       . |      .
                                            |       . |       . |
                                            |       . |       . |
                                   ---------+---------+---------+
OVERLAND PARK  . . . . . .                1 |      20 |      16 |     36
                                            |    2.89 |    2.31 |   5.20
                                            |   55.56 |   44.44 |
                                            |    6.06 |    4.42 |
                                   ---------+---------+---------+
KANSAS CITY, KANSAS . . . . .             2 |      79 |      86 |    165
                                            |   11.42 |   12.43 |  23.84
                                            |   47.88 |   52.12 |
                                            |   23.94 |   23.76 |
                                   ---------+---------+---------+
LENEXA     . . . . . . .                  3 |       7 |       9 |     16
                                            |    1.01 |    1.30 |   2.31
                                            |   43.75 |   56.25 |
                                            |    2.12 |    2.49 |
                                   ---------+---------+---------+
ROELAND PARK   . . . . . .                4 |       2 |       3 |      5
                                            |    0.29 |    0.43 |   0.72
                                            |   40.00 |   60.00 |
                                            |    0.61 |    0.83 |
                                   ---------+---------+---------+
LAWRENCE   . . . . . . .                  5 |      18 |      20 |     38
                                            |    2.60 |    2.89 |   5.49
                                            |   47.37 |   52.63 |
                                            |    5.45 |    5.52 |
                                   ---------+---------+---------+
PRARIE VILLAGE . . . . . .                6 |       1 |       3 |      4
                                            |    0.14 |    0.43 |   0.58
                                            |   25.00 |   75.00 |
                                            |    0.30 |    0.83 |
                                   ---------+---------+---------+
                                   TOTAL         330       362      692
                                               47.69     52.31   100.00
```

```
                          S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                  TABLE OF COL9_10 BY COL20_21

CITY-TOWN                  COL9_10        COL20_21
(CONTINUED)
                           FREQUENCY|
                           PERCENT  |
                           ROW PCT  |
                           COL PCT  |      75|      76|  TOTAL
                           ---------+--------+--------+
SHAWNEE  . . . . . . .             7 |     12 |     13 |     25
                                    |   1.73 |   1.88 |   3.61
                                    |  48.00 |  52.00 |
                                    |   3.64 |   3.59 |
                           ---------+--------+--------+
MERRIAM  . . . . . . .             8 |      6 |      3 |      9
                                    |   0.87 |   0.43 |   1.30
                                    |  66.67 |  33.33 |
                                    |   1.82 |   0.83 |
                           ---------+--------+--------+
WESTWOOD . . . . . . .             9 |      1 |      1 |      2
                                    |   0.14 |   0.14 |   0.29
                                    |  50.00 |  50.00 |
                                    |   0.30 |   0.28 |
                           ---------+--------+--------+
OLATHE   . . . . . . .            10 |      4 |      6 |     10
                                    |   0.58 |   0.87 |   1.45
                                    |  40.00 |  60.00 |
                                    |   1.21 |   1.66 |
                           ---------+--------+--------+
TOPEKA   . . . . . . .            11 |     44 |     53 |     97
                                    |   6.36 |   7.66 |  14.02
                                    |  45.36 |  54.64 |
                                    |  13.33 |  14.64 |
                           ---------+--------+--------+
WICHITA  . . . . . . .            12 |    124 |    144 |    268
                                    |  17.92 |  20.81 |  38.73
                                    |  46.27 |  53.73 |
                                    |  37.58 |  39.78 |
                           ---------+--------+--------+
HAYSVILLE . . . . . .             13 |      2 |      0 |      2
                                    |   0.29 |   0.00 |   0.29
                                    | 100.00 |   0.00 |
                                    |   0.61 |   0.00 |
                           ---------+--------+--------+
                           TOTAL         330      362      692
                                       47.69    52.31   100.00
```

```
                         S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                     TABLE OF COL9_10 BY COL20_21

                           COL9_10      COL20_21
CITY - TOWN
(CONTINUED)                FREQUENCY|
                           PERCENT  |
                           ROW PCT  |
                           COL PCT  |      75|      76|  TOTAL
                           ---------+--------+--------+
LEAWOOD  . . . . . . . .   14       |      2 |      1 |      3
                                    |   0.29 |   0.14 |   0.43
                                    |  66.67 |  33.33 |
                                    |   0.61 |   0.28 |
                           ---------+--------+--------+
ANDALE   . . . . . . . .   15       |      1 |      0 |      1
                                    |   0.14 |   0.00 |   0.14
                                    | 100.00 |   0.00 |
                                    |   0.30 |   0.00 |
                           ---------+--------+--------+
LAKE QUIVERA . . . . . .   16       |      0 |      1 |      1
                                    |   0.00 |   0.14 |   0.14
                                    |   0.00 | 100.00 |
                                    |   0.00 |   0.28 |
                           ---------+--------+--------+
MISSION  . . . . . . . .   17       |      4 |      2 |      6
                                    |   0.58 |   0.29 |   0.87
                                    |  66.67 |  33.33 |
                                    |   1.21 |   0.55 |
                           ---------+--------+--------+
DE SOTO  . . . . . . . .   18       |      1 |      0 |      1
                                    |   0.14 |   0.00 |   0.14
                                    | 100.00 |   0.00 |
                                    |   0.30 |   0.00 |
                           ---------+--------+--------+
VALLEY CENTER  . . . . .   19       |      2 |      0 |      2
                                    |   0.29 |   0.00 |   0.29
                                    | 100.00 |   0.00 |
                                    |   0.61 |   0.00 |
                           ---------+--------+--------+
BONNER SPRINGS . . . . .   21       |      0 |      1 |      1
                                    |   0.00 |   0.14 |   0.14
                                    |   0.00 | 100.00 |
                                    |   0.00 |   0.28 |
                           ---------+--------+--------+
                           TOTAL         330      362      692
                                       47.69    52.31   100.00
```

LAW ENFORCEMENT AGENCIES
REPORTING MOTORCYCLE ACCIDENTS

KEY ON PAGES
C-1 AND C-2

```
                    S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                            TABLE OF COL11_14 BY COL20_21

                    COL11_14     COL20_21

                    FREQUENCY|
                     PERCENT |
                     ROW PCT |
                     COL PCT |      75|      76|  TOTAL
                    ---------+--------+--------+
                             |      8 |      5 |      .
                             |      . |      . |      .
                             |      . |      . |
                             |      . |      . |
                    ---------+--------+--------+
                    APSW     |      1 |      0 |      1
                             |   0.14 |   0.00 |   0.14
                             | 100.00 |   0.00 |
                             |   0.29 |   0.00 |
                    ---------+--------+--------+
                    BSPD     |      0 |      1 |      1
                             |   0.00 |   0.14 |   0.14
                             |   0.00 | 100.00 |
                             |   0.00 |   0.26 |
                    ---------+--------+--------+
                    DGSD     |      0 |      2 |      2
                             |   0.00 |   0.28 |   0.28
                             |   0.00 | 100.00 |
                             |   0.00 |   0.53 |
                    ---------+--------+--------+
                    FWPD     |      0 |      2 |      2
                             |   0.00 |   0.28 |   0.28
                             |   0.00 | 100.00 |
                             |   0.00 |   0.53 |
                    ---------+--------+--------+
                    HVPD     |      2 |      0 |      2
                             |   0.28 |   0.00 |   0.28
                             | 100.00 |   0.00 |
                             |   0.58 |   0.00 |
                    ---------+--------+--------+
                    JCSP     |      7 |      6 |     13
                             |   0.97 |   0.83 |   1.80
                             |  53.85 |  46.15 |
                             |   2.04 |   1.58 |
                    ---------+--------+--------+
                    KCKP     |     75 |     76 |    151
                             |  10.37 |  10.51 |  20.89
                             |  49.67 |  50.33 |
                             |  21.87 |  20.00 |
                    ---------+--------+--------+
                    TOTAL         343      380      723
                                47.44    52.56   100.00
```

LAW ENFORCEMENT AGENCIES
REPORTING MOTORCYCLE ACCIDENTS
(CONTINUED)

KEY ON PAGES
C-1 AND C-2

```
                TABLE OF COL11_14 BY COL20_21

COL11_14     COL20_21

FREQUENCY|
 PERCENT |
 ROW PCT |
 COL PCT |      75|      76|  TOTAL
---------+--------+--------+
KSHP     |     11 |     19 |     30
         |   1.52 |   2.63 |   4.15
         |  36.67 |  63.33 |
         |   3.21 |   5.00 |
---------+--------+--------+
KUPD     |      2 |      1 |      3
         |   0.28 |   0.14 |   0.41
         |  66.67 |  33.33 |
         |   0.58 |   0.26 |
---------+--------+--------+
LPD      |     16 |     18 |     34
         |   2.21 |   2.49 |   4.70
         |  47.06 |  52.94 |
         |   4.66 |   4.74 |
---------+--------+--------+
LWPD     |      2 |      1 |      3
         |   0.28 |   0.14 |   0.41
         |  66.67 |  33.33 |
         |   0.58 |   0.26 |
---------+--------+--------+
LXPD     |      4 |      8 |     12
         |   0.55 |   1.11 |   1.66
         |  33.33 |  66.67 |
         |   1.17 |   2.11 |
---------+--------+--------+
MPD      |      4 |      2 |      6
         |   0.55 |   0.28 |   0.83
         |  66.67 |  33.33 |
         |   1.17 |   0.53 |
---------+--------+--------+
MPPD     |      0 |      1 |      1
         |   0.00 |   0.14 |   0.14
         |   0.00 | 100.00 |
         |   0.00 |   0.26 |
---------+--------+--------+
MRPD     |      6 |      2 |      8
         |   0.83 |   0.28 |   1.11
         |  75.00 |  25.00 |
         |   1.75 |   0.53 |
---------+--------+--------+
TOTAL         343      380      723
            47.44    52.56   100.00
```

LAW ENFORCEMENT AGENCIES REPORTING MOTORCYCLE ACCIDENTS (CONTINUED)

KEY ON PAGES C-1 AND C-2

```
                TABLE OF COL11_14 BY COL20_21

COL11_14      COL20_21

FREQUENCY|
PERCENT  |
ROW PCT  |
COL PCT  |      75|      76|  TOTAL
---------+--------+--------+
OPD      |      3 |      6 |      9
         |   0.41 |   0.83 |   1.24
         |  33.33 |  66.67 |
         |   0.87 |   1.58 |
---------+--------+--------+
GPPD     |     18 |     16 |     34
         |   2.49 |   2.21 |   4.70
         |  52.94 |  47.06 |
         |   5.25 |   4.21 |
---------+--------+--------+
PVPD     |      1 |      3 |      4
         |   0.14 |   0.41 |   0.55
         |  25.00 |  75.00 |
         |   0.29 |   0.79 |
---------+--------+--------+
RPPD     |      2 |      2 |      4
         |   0.28 |   0.28 |   0.55
         |  50.00 |  50.00 |
         |   0.58 |   0.53 |
---------+--------+--------+
SCLP     |      1 |      0 |      1
         |   0.14 |   0.00 |   0.14
         | 100.00 |   0.00 |
         |   0.29 |   0.00 |
---------+--------+--------+
SCPP     |      1 |      0 |      1
         |   0.14 |   0.00 |   0.14
         | 100.00 |   0.00 |
         |   0.29 |   0.00 |
---------+--------+--------+
SCSD     |     22 |     15 |     37
         |   3.04 |   2.07 |   5.12
         |  59.46 |  40.54 |
         |   6.41 |   3.95 |
---------+--------+--------+
SNSD     |     10 |      4 |     14
         |   1.38 |   0.55 |   1.94
         |  71.43 |  28.57 |
         |   2.92 |   1.05 |
---------+--------+--------+
TOTAL         343      380      723
            47.44    52.56   100.00
```

LAW ENFORCEMENT AGENCIES
REPORTING MOTORCYCLE ACCIDENTS
(CONTINUED)

KEY ON PAGES
C-1 AND C-2

```
                TABLE OF COL11_14 BY COL20_21

COL11_14     COL20_21

FREQUENCY|
 PERCENT |
 ROW PCT |
 COL PCT |      75|      76|  TOTAL
---------+--------+--------+
SPD      |     11 |     13 |     24
         |   1.52 |   1.80 |   3.32
         |  45.83 |  54.17 |
         |   3.21 |   3.42 |
---------+--------+--------+
TPD      |     34 |     49 |     83
         |   4.70 |   6.78 |  11.48
         |  40.96 |  59.04 |
         |   9.91 |  12.89 |
---------+--------+--------+
VCPD     |      2 |      0 |      2
         |   0.28 |   0.00 |   0.28
         | 100.00 |   0.00 |
         |   0.58 |   0.00 |
---------+--------+--------+
WPD      |    105 |    131 |    236
         |  14.52 |  18.12 |  32.64
         |  44.49 |  55.51 |
         |  30.61 |  34.47 |
---------+--------+--------+
WWPD     |      1 |      1 |      2
         |   0.14 |   0.14 |   0.28
         |  50.00 |  50.00 |
         |   0.29 |   0.26 |
---------+--------+--------+
WYSP     |      2 |      0 |      2
         |   0.28 |   0.00 |   0.28
         | 100.00 |   0.00 |
         |   0.58 |   0.00 |
---------+--------+--------+
ZPD      |      0 |      1 |      1
         |   0.00 |   0.14 |   0.14
         |   0.00 | 100.00 |
         |   0.00 |   0.26 |
---------+--------+--------+
TOTAL         343      380      723
            47.44    52.56   100.00
```

```
                         S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                   TABLE OF COL15 BY COL20_21

ACCIDENT LOCATION
                         COL15        COL20_21

                         FREQUENCY|
                          PERCENT |
                          ROW PCT |
                          COL PCT |       75|       76|  TOTAL
                         ---------+--------+--------+
RURAL . . . . . . . . . . .    1  |     31 |     20 |     51
                                  |   4.21 |   2.72 |   6.93
                                  |  60.78 |  39.22 |
                                  |   8.83 |   5.19 |
                         ---------+--------+--------+
URBAN . . . . . . . . . . .    2  |    320 |    365 |    685
                                  |  43.48 |  49.59 |  93.07
                                  |  46.72 |  53.28 |
                                  |  91.17 |  94.81 |
                         ---------+--------+--------+
                         TOTAL         351      385      736
                                     47.69    52.31   100.00
```

2

```
                          S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                         TABLE OF COL22 BY COL20_21

                               COL22        COL20_21
DAY OF WEEK
                               FREQUENCY|
                                PERCENT |
                                ROW PCT |
                                COL PCT |      75|      76|  TOTAL
                               ---------+--------+--------+
                                      . |      0 |      2 |      .
                                        |      . |      . |      .
                                        |      . |      . |
                                        |      . |      . |
                               ---------+--------+--------+
SUNDAY . . . . . . . . . . . . 1        |     48 |     49 |     97
                                        |   6.54 |   6.68 |  13.22
                                        |  49.48 |  50.52 |
                                        |  13.68 |  12.79 |
                               ---------+--------+--------+
MONDAY . . . . . . . . . . . . 2        |     39 |     40 |     79
                                        |   5.31 |   5.45 |  10.76
                                        |  49.37 |  50.63 |
                                        |  11.11 |  10.44 |
                               ---------+--------+--------+
TUESDAY . . . . . . . . . . . 3         |     46 |     52 |     98
                                        |   6.27 |   7.08 |  13.35
                                        |  46.94 |  53.06 |
                                        |  13.11 |  13.58 |
                               ---------+--------+--------+
WEDNESDAY . . . . . . . . . . 4         |     46 |     53 |     99
                                        |   6.27 |   7.22 |  13.49
                                        |  46.46 |  53.54 |
                                        |  13.11 |  13.84 |
                               ---------+--------+--------+
THURSDAY  . . . . . . . . . . 5         |     43 |     54 |     97
                                        |   5.86 |   7.36 |  13.22
                                        |  44.33 |  55.67 |
                                        |  12.25 |  14.10 |
                               ---------+--------+--------+
FRIDAY    . . . . . . . . . . 6         |     63 |     69 |    132
                                        |   8.58 |   9.40 |  17.98
                                        |  47.73 |  52.27 |
                                        |  17.95 |  18.02 |
                               ---------+--------+--------+
SATURDAY  . . . . . . . . . . 7         |     66 |     66 |    132
                                        |   8.99 |   8.99 |  17.98
                                        |  50.00 |  50.00 |
                                        |  18.80 |  17.23 |
                               ---------+--------+--------+
                               TOTAL         351      383      734
                                           47.82    52.18   100.00
```

TIME OF ACCIDENT
(MILITARY TIME)

```
                  S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                              TABLE OF COL23_26 BY COL20_21

                        COL23_26      COL20_21

                        FREQUENCY|
                         PERCENT |
                         ROW PCT |
                         COL PCT |       75|       76|  TOTAL
                        ---------+---------+---------+
                               . |      1  |      0  |      .
                                 |      .  |      .  |      .
                                 |      .  |      .  |
                                 |      .  |      .  |
                        ---------+---------+---------+
                             100 |     11  |     12  |     23
                                 |   1.50  |   1.63  |   3.13
                                 |  47.83  |  52.17  |
                                 |   3.14  |   3.12  |
                        ---------+---------+---------+
                             200 |      5  |      3  |      8
                                 |   0.68  |   0.41  |   1.09
                                 |  62.50  |  37.50  |
                                 |   1.43  |   0.78  |
                        ---------+---------+---------+
                             300 |      7  |      6  |     13
                                 |   0.95  |   0.82  |   1.77
                                 |  53.85  |  46.15  |
                                 |   2.00  |   1.56  |
                        ---------+---------+---------+
                             400 |      3  |      0  |      3
                                 |   0.41  |   0.00  |   0.41
                                 | 100.00  |   0.00  |
                                 |   0.86  |   0.00  |
                        ---------+---------+---------+
                             500 |      2  |      0  |      2
                                 |   0.27  |   0.00  |   0.27
                                 | 100.00  |   0.00  |
                                 |   0.57  |   0.00  |
                        ---------+---------+---------+
                             600 |      2  |      3  |      5
                                 |   0.27  |   0.41  |   0.68
                                 |  40.00  |  60.00  |
                                 |   0.57  |   0.78  |
                        ---------+---------+---------+
                        TOTAL         350       385      735
                                    47.62     52.38   100.00
```

TIME OF ACCIDENT
(MILITARY TIME)
(CONTINUED)

```
S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

               TABLE OF COL23_26 BY COL20_21

COL23_26     COL20_21

FREQUENCY|
 PERCENT |
 ROW PCT |
 COL PCT |      75|      76|  TOTAL
---------+--------+--------+
     700 |     12 |      6 |     18
         |   1.63 |   0.82 |   2.45
         |  66.67 |  33.33 |
         |   3.43 |   1.56 |
---------+--------+--------+
     800 |     14 |     13 |     27
         |   1.90 |   1.77 |   3.67
         |  51.85 |  48.15 |
         |   4.00 |   3.38 |
---------+--------+--------+
     900 |      8 |      6 |     14
         |   1.09 |   0.82 |   1.90
         |  57.14 |  42.86 |
         |   2.29 |   1.56 |
---------+--------+--------+
    1000 |      7 |     11 |     18
         |   0.95 |   1.50 |   2.45
         |  38.89 |  61.11 |
         |   2.00 |   2.86 |
---------+--------+--------+
    1100 |     14 |     13 |     27
         |   1.90 |   1.77 |   3.67
         |  51.85 |  48.15 |
         |   4.00 |   3.38 |
---------+--------+--------+
    1200 |     16 |     22 |     38
         |   2.18 |   2.99 |   5.17
         |  42.11 |  57.89 |
         |   4.57 |   5.71 |
---------+--------+--------+
    1300 |     13 |     22 |     35
         |   1.77 |   2.99 |   4.76
         |  37.14 |  62.86 |
         |   3.71 |   5.71 |
---------+--------+--------+
TOTAL         350      385      735
            47.62    52.38   100.00
```

TIME OF ACCIDENT
(MILITARY TIME)
(CONTINUED)

```
                S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                         TABLE OF COL23_26 BY COL20_21

             COL23_26     COL20_21

             FREQUENCY|
             PERCENT  |
             ROW PCT  |
             COL PCT  |      75|      76|  TOTAL
             ---------+--------+--------+
                 1400 |     19 |     17 |     36
                      |   2.59 |   2.31 |   4.90
                      |  52.78 |  47.22 |
                      |   5.43 |   4.42 |
             ---------+--------+--------+
                 1500 |     25 |     21 |     46
                      |   3.40 |   2.86 |   6.26
                      |  54.35 |  45.65 |
                      |   7.14 |   5.45 |
             ---------+--------+--------+
                 1600 |     29 |     34 |     63
                      |   3.95 |   4.63 |   8.57
                      |  46.03 |  53.97 |
                      |   8.29 |   8.83 |
             ---------+--------+--------+
                 1700 |     43 |     28 |     71
                      |   5.85 |   3.81 |   9.66
                      |  60.56 |  39.44 |
                      |  12.29 |   7.27 |
             ---------+--------+--------+
                 1800 |     24 |     35 |     59
                      |   3.27 |   4.76 |   8.03
                      |  40.68 |  59.32 |
                      |   6.86 |   9.09 |
             ---------+--------+--------+
                 1900 |     21 |     35 |     56
                      |   2.86 |   4.76 |   7.62
                      |  37.50 |  62.50 |
                      |   6.00 |   9.09 |
             ---------+--------+--------+
                 2000 |     21 |     22 |     43
                      |   2.86 |   2.99 |   5.85
                      |  48.84 |  51.16 |
                      |   6.00 |   5.71 |
             ---------+--------+--------+
             TOTAL         350      385      735
                         47.62    52.38   100.00
```

TIME OF ACCIDENT
(MILITARY TIME)
(CONTINUED)

```
S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

            TABLE OF COL23_26 BY COL20_21

COL23_26     COL20_21

FREQUENCY|
PERCENT  |
ROW PCT  |
COL PCT  |      75|      76|  TOTAL
---------+--------+--------+
    2100 |     11 |     17 |     28
         |   1.50 |   2.31 |   3.81
         |  39.29 |  60.71 |
         |   3.14 |   4.42 |
---------+--------+--------+
    2200 |     16 |     19 |     35
         |   2.18 |   2.59 |   4.76
         |  45.71 |  54.29 |
         |   4.57 |   4.94 |
---------+--------+--------+
    2300 |     13 |     18 |     31
         |   1.77 |   2.45 |   4.22
         |  41.94 |  58.06 |
         |   3.71 |   4.68 |
---------+--------+--------+
    2400 |     14 |     22 |     36
         |   1.90 |   2.99 |   4.90
         |  38.89 |  61.11 |
         |   4.00 |   5.71 |
---------+--------+--------+
TOTAL         350      385      735
            47.62    52.38   100.00
```

```
                             S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                          TABLE OF COL27_29 BY COL20_21

ESTIMATED SPEED JUST             COL27_29       COL20_21
PRIOR TO ACCIDENT
                                 FREQUENCY|
                                  PERCENT |
                                  ROW PCT |
                                  COL PCT |      75|      76|  TOTAL
                                 ---------+--------+--------+
                                        . |     75 |     80 |      .
                                          |      . |      . |      .
                                          |      . |      . |
                                          |      . |      . |
                                 ---------+--------+--------+
                                        0 |     13 |     17 |     30
                                          |   2.24 |   2.93 |   5.16
                                          |  43.33 |  56.67 |
                                          |   4.71 |   5.57 |
                                 ---------+--------+--------+
  1 TO 15 MPH  . . . . . . . 1 |     44 |     32 |     76
                                          |   7.57 |   5.51 |  13.08
                                          |  57.89 |  42.11 |
                                          |  15.94 |  10.49 |
                                 ---------+--------+--------+
 16 TO 30 MPH  . . . . . . . 2 |     76 |    102 |    178
                                          |  13.08 |  17.56 |  30.64
                                          |  42.70 |  57.30 |
                                          |  27.54 |  33.44 |
                                 ---------+--------+--------+
 31 TO 45 MPH  . . . . . . . 3 |    110 |    120 |    230
                                          |  18.93 |  20.65 |  39.59
                                          |  47.83 |  52.17 |
                                          |  39.36 |  39.34 |
                                 ---------+--------+--------+
 46 TO 60 MPH  . . . . . . . 4 |     28 |     30 |     58
                                          |   4.82 |   5.16 |   9.98
                                          |  48.28 |  51.72 |
                                          |  10.14 |   9.84 |
                                 ---------+--------+--------+
MORE THAN 61 MPH   . . . . . . 5 |      5 |      4 |      9
                                          |   0.86 |   0.69 |   1.55
                                          |  55.56 |  44.44 |
                                          |   1.81 |   1.31 |
                                 ---------+--------+--------+
                                 TOTAL         276      305      581
                                             47.50    52.50   100.00
```

```
                          S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                    TABLE OF COL30 BY COL20_21

                          COL30        COL20_21
ACCIDENT CLASSIFICATION
                          FREQUENCY|
                          PERCENT  |
                          ROW PCT  |
                          COL PCT  |      75|      76|  TOTAL
                          ---------+--------+--------+
                              .    |      1 |      4 |      .
                                   |      . |      . |      .
                                   |      . |      . |
                                   |      . |      . |
                          ---------+--------+--------+
TRAFFIC   . . . . . . . .     1    |    221 |    268 |    489
                                   |  30.23 |  36.66 |  66.89
                                   |  45.19 |  54.81 |
                                   |  63.14 |  70.34 |
                          ---------+--------+--------+
NON-TRAFFIC   . . . . . .     2    |    129 |    113 |    242
                                   |  17.65 |  15.46 |  33.11
                                   |  53.31 |  46.69 |
                                   |  36.86 |  29.66 |
                          ---------+--------+--------+
                          TOTAL         350      381      731
                                      47.88    52.12   100.00
```

```
                    S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                              TABLE OF COL31_32 BY COL20_21

                         COL31_32     COL20_21
```

MOTORCYCLE MODEL YEAR

```
                         FREQUENCY|
                          PERCENT |
                          ROW PCT |
                          COL PCT |      75|      76|  TOTAL
                         ---------+--------+--------+
                                . |     11 |     10 |      .
                                  |      . |      . |      .
                                  |      . |      . |
                                  |      . |      . |
                         ---------+--------+--------+
                               48 |      0 |      1 |      1
                                  |   0.00 |   0.14 |   0.14
                                  |   0.00 | 100.00 |
                                  |   0.00 |   0.27 |
                         ---------+--------+--------+
                               50 |      0 |      1 |      1
                                  |   0.00 |   0.14 |   0.14
                                  |   0.00 | 100.00 |
                                  |   0.00 |   0.27 |
                         ---------+--------+--------+
                               53 |      1 |      0 |      1
                                  |   0.14 |   0.00 |   0.14
                                  | 100.00 |   0.00 |
                                  |   0.29 |   0.00 |
                         ---------+--------+--------+
                               54 |      0 |      1 |      1
                                  |   0.00 |   0.14 |   0.14
                                  |   0.00 | 100.00 |
                                  |   0.00 |   0.27 |
                         ---------+--------+--------+
                               58 |      1 |      0 |      1
                                  |   0.14 |   0.00 |   0.14
                                  | 100.00 |   0.00 |
                                  |   0.29 |   0.00 |
                         ---------+--------+--------+
                               59 |      1 |      1 |      2
                                  |   0.14 |   0.14 |   0.28
                                  |  50.00 |  50.00 |
                                  |   0.29 |   0.27 |
                         ---------+--------+--------+
                               61 |      1 |      1 |      2
                                  |   0.14 |   0.14 |   0.28
                                  |  50.00 |  50.00 |
                                  |   0.29 |   0.27 |
                         ---------+--------+--------+
                         TOTAL         340      375      715
                                     47.55    52.45   100.00
```

MOTORCYCLE MODEL YEAR
(CONTINUED)

```
                     TABLE OF COL31_32 BY COL20_21

COL31_32     COL20_21

FREQUENCY|
 PERCENT |
 ROW PCT |
 COL PCT |      75|      76|  TOTAL
---------+--------+--------+
      62 |      0 |      2 |      2
         |   0.00 |   0.28 |   0.28
         |   0.00 | 100.00 |
         |   0.00 |   0.53 |
---------+--------+--------+
      63 |      2 |      1 |      3
         |   0.28 |   0.14 |   0.42
         |  66.67 |  33.33 |
         |   0.59 |   0.27 |
---------+--------+--------+
      64 |      1 |      3 |      4
         |   0.14 |   0.42 |   0.56
         |  25.00 |  75.00 |
         |   0.29 |   0.80 |
---------+--------+--------+
      65 |      2 |      2 |      4
         |   0.28 |   0.28 |   0.56
         |  50.00 |  50.00 |
         |   0.59 |   0.53 |
---------+--------+--------+
      66 |      4 |      5 |      9
         |   0.56 |   0.70 |   1.26
         |  44.44 |  55.56 |
         |   1.18 |   1.33 |
---------+--------+--------+
      67 |      7 |      3 |     10
         |   0.98 |   0.42 |   1.40
         |  70.00 |  30.00 |
         |   2.06 |   0.80 |
---------+--------+--------+
      68 |      4 |      4 |      8
         |   0.56 |   0.56 |   1.12
         |  50.00 |  50.00 |
         |   1.18 |   1.07 |
---------+--------+--------+
      69 |      2 |     13 |     15
         |   0.28 |   1.82 |   2.10
         |  13.33 |  86.67 |
         |   0.59 |   3.47 |
---------+--------+--------+
TOTAL         340      375      715
            47.55    52.45   100.00
```

MOTORCYCLE MODEL YEAR
(CONTINUED)

```
                 S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                        TABLE OF COL31_32 BY COL20_21

COL31_32     COL20_21

FREQUENCY|
PERCENT  |
ROW PCT  |
COL PCT  |      75|      76|  TOTAL
---------+--------+--------+
      70 |     18 |     21 |     39
         |   2.52 |   2.94 |   5.45
         |  46.15 |  53.85 |
         |   5.29 |   5.60 |
---------+--------+--------+
      71 |     44 |     28 |     72
         |   6.15 |   3.92 |  10.07
         |  61.11 |  38.89 |
         |  12.94 |   7.47 |
---------+--------+--------+
      72 |     59 |     58 |    117
         |   8.25 |   8.11 |  16.36
         |  50.43 |  49.57 |
         |  17.35 |  15.47 |
---------+--------+--------+
      73 |     72 |     54 |    126
         |  10.07 |   7.55 |  17.62
         |  57.14 |  42.86 |
         |  21.18 |  14.40 |
---------+--------+--------+
      74 |     70 |     62 |    132
         |   9.79 |   8.67 |  18.46
         |  53.03 |  46.97 |
         |  20.59 |  16.53 |
---------+--------+--------+
      75 |     51 |     66 |    117
         |   7.13 |   9.23 |  16.36
         |  43.59 |  56.41 |
         |  15.00 |  17.60 |
---------+--------+--------+
      76 |      0 |     48 |     48
         |   0.00 |   6.71 |   6.71
         |   0.00 | 100.00 |
         |   0.00 |  12.80 |
---------+--------+--------+
TOTAL         340      375      715
            47.55    52.45   100.00
```

```
                   S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                               TABLE OF COL33_35 BY COL20_21
DRIVER EXPERIENCE
IN MONTHS                  COL33_35     COL20_21

                           FREQUENCY|
                            PERCENT |
                            ROW PCT |
                            COL PCT |      75|      76|  TOTAL
                           ---------+--------+--------+
                                  . |    134 |    142 |      .
                                    |      . |      . |      .
                                    |      . |      . |
                                    |      . |      . |
                           ---------+--------+--------+
LESS THAN ONE MONTH . . . . .     1 |      8 |      5 |     13
                                    |   1.74 |   1.09 |   2.83
                                    |  61.54 |  38.46 |
                                    |   3.69 |   2.06 |
                           ---------+--------+--------+
1 TO 3 MONTHS  . . . . . .        2 |      1 |      2 |      3
                                    |   0.22 |   0.43 |   0.65
                                    |  33.33 |  66.67 |
                                    |   0.46 |   0.82 |
                           ---------+--------+--------+
4 TO 6 MONTHS  . . . . . .        3 |      2 |      3 |      5
                                    |   0.43 |   0.65 |   1.09
                                    |  40.00 |  60.00 |
                                    |   0.92 |   1.23 |
                           ---------+--------+--------+
7 TO 12 MONTHS . . . . . .        4 |     14 |     23 |     37
                                    |   3.04 |   5.00 |   8.04
                                    |  37.84 |  62.16 |
                                    |   6.45 |   9.47 |
                           ---------+--------+--------+
                           TOTAL         217      243      460
                                       47.17    52.83   100.00
                   S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                 TABLE OF COL33_35 BY COL20_21
DRIVER EXPERIENCE
IN MONTHS                  COL33_35      COL20_21
    (CONTINUED)
                           FREQUENCY|
                            PERCENT |
                            ROW PCT |
                            COL PCT |      75|      76|  TOTAL
                           ---------+--------+--------+
13 TO 24 MONTHS . . . . . .       5 |     17 |     18 |     35
                                    |   3.70 |   3.91 |   7.61
                                    |  48.57 |  51.43 |
                                    |   7.83 |   7.41 |
                           ---------+--------+--------+
25 TO 48 MONTHS . . . . . .       6 |     28 |     45 |     73
                                    |   6.09 |   9.78 |  15.87
                                    |  38.36 |  61.64 |
                                    |  12.90 |  18.52 |
                           ---------+--------+--------+
49 TO 96 MONTHS . . . . . .       7 |     72 |     70 |    142
                                    |  15.65 |  15.22 |  30.87
                                    |  50.70 |  49.30 |
                                    |  33.18 |  28.81 |
                           ---------+--------+--------+
MORE THAN 96 MONTHS . . . .       8 |     75 |     77 |    152
                                    |  16.30 |  16.74 |  33.04
                                    |  49.34 |  50.66 |
                                    |  34.56 |  31.69 |
                           ---------+--------+--------+
                           TOTAL         217      243      460
                                       47.17    52.83   100.00
```

```
                    S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                TABLE OF COL36 BY COL20_21

                      COL36          COL20_21
NUMBER OF RIDERS
INCLUDING DRIVER      FREQUENCY|
                       PERCENT |
                       ROW PCT |
                       COL PCT |      75|      76|  TOTAL
                      ---------+--------+--------+
                             . |      3 |      0 |      .
                               |      . |      . |      .
                               |      . |      . |
                               |      . |      . |
                      ---------+--------+--------+
                             1 |    289 |    300 |    589
                               |  39.43 |  40.93 |  80.35
                               |  49.07 |  50.93 |
                               |  83.05 |  77.92 |
                      ---------+--------+--------+
                             2 |     59 |     85 |    144
                               |   8.05 |  11.60 |  19.65
                               |  40.97 |  59.03 |
                               |  16.95 |  22.08 |
                      ---------+--------+--------+
                      TOTAL         348      385      733
                                  47.48    52.52   100.00
```

```
                          S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                         TABLE OF COL37 BY COL20_21

RIDER POSITION                   COL37          COL20_21

                                 FREQUENCY|
                                  PERCENT |
                                  ROW PCT |
                                  COL PCT |      75|      76|  TOTAL
                                 ---------+--------+--------+
                                        . |      7 |      4 |      .
                                          |      . |      . |      .
                                          |      . |      . |
                                          |      . |      . |
                                 ---------+--------+--------+
DRIVER  . . . . . . . . . . . . . 1       |    346 |    377 |    723
                                          |  41.44 |  45.15 |  86.59
                                          |  47.86 |  52.14 |
                                          |  88.49 |  84.91 |
                                 ---------+--------+--------+
PASSENGER . . . . . . . . . . . . 2       |     44 |     67 |    111
                                          |   5.27 |   8.02 |  13.29
                                          |  39.64 |  60.36 |
                                          |  11.25 |  15.09 |
                                 ---------+--------+--------+
SECOND PASSENGER  . . . . . . . . 4       |      1 |      0 |      1
                                          |   0.12 |   0.00 |   0.12
                                          | 100.00 |   0.00 |
                                          |   0.26 |   0.00 |
                                 ---------+--------+--------+
                                 TOTAL         391      444      835
                                             46.83    53.17   100.00
```

```
                              S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                     TABLE OF COL38 BY COL20_21
FIRST INJURY LOCATION
                                  COL38        COL20_21

                                  FREQUENCY|
                                   PERCENT |
                                   ROW PCT |
                                   COL PCT |      75|      76|  TOTAL
                                  ---------+--------+--------+
                                         . |    261 |    256 |      .
                                           |      . |      . |      .
                                           |      . |      . |
                                           |      . |      . |
                                  ---------+--------+--------+
GENERAL BODY  . . . . . .                1 |    124 |    180 |    304
                                           |  37.69 |  54.71 |  92.40
                                           |  40.79 |  59.21 |
                                           |  90.51 |  93.75 |
                                  ---------+--------+--------+
HEAD AND FACE . . . . . .                2 |      3 |      3 |      6
                                           |   0.91 |   0.91 |   1.82
                                           |  50.00 |  50.00 |
                                           |   2.19 |   1.56 |
                                  ---------+--------+--------+
NECK  . . . . . . . .                    3 |      1 |      0 |      1
                                           |   0.30 |   0.00 |   0.30
                                           | 100.00 |   0.00 |
                                           |   0.73 |   0.00 |
                                  ---------+--------+--------+
ABDOMEN   . . . . . . .                  5 |      0 |      2 |      2
                                           |   0.00 |   0.61 |   0.61
                                           |   0.00 | 100.00 |
                                           |   0.00 |   1.04 |
                                  ---------+--------+--------+
EXTREMITIES   . . . . . .                6 |      9 |      7 |     16
                                           |   2.74 |   2.13 |   4.86
                                           |  56.25 |  43.75 |
                                           |   6.57 |   3.65 |
                                  ---------+--------+--------+
                                  TOTAL         137      192      329
                                              41.64    58.36   100.00
```

```
                          STATISTICAL ANALYSIS SYSTEM

                              TABLE OF COL39 BY COL20_21

SECOND INJURY LOCATION     COL39        COL20_21

                           FREQUENCY|
                           PERCENT  |
                           ROW PCT  |
                           COL PCT  |      75|      76|  TOTAL
                           ---------+--------+--------+
                                  . |     313 |    314 |      .
                                    |       . |      . |      .
                                    |       . |      . |
                                    |       . |      . |
                           ---------+--------+--------+
GENERAL BODY . . . . . . . 1        |       0 |      2 |      2
                                    |    0.00 |   0.91 |   0.91
                                    |    0.00 | 100.00 |
                                    |    0.00 |   1.49 |
                           ---------+--------+--------+
HEAD AND FACE  . . . . . . 2        |      38 |     69 |    107
                                    |   17.35 |  31.51 |  48.86
                                    |   35.51 |  64.49 |
                                    |   44.71 |  51.49 |
                           ---------+--------+--------+
NECK . . . . . . . . . . . 3        |       3 |      4 |      7
                                    |    1.37 |   1.83 |   3.20
                                    |   42.86 |  57.14 |
                                    |    3.53 |   2.99 |
                           ---------+--------+--------+
CHEST  . . . . . . . . . . 4        |       2 |      9 |     11
                                    |    0.91 |   4.11 |   5.02
                                    |   18.18 |  81.82 |
                                    |    2.35 |   6.72 |
                           ---------+--------+--------+
ABDOMEN  . . . . . . . . . 5        |       3 |      6 |      9
                                    |    1.37 |   2.74 |   4.11
                                    |   33.33 |  66.67 |
                                    |    3.53 |   4.48 |
                           ---------+--------+--------+
EXTREMITIES  . . . . . . . 6        |      39 |     44 |     83
                                    |   17.81 |  20.09 |  37.90
                                    |   46.99 |  53.01 |
                                    |   45.88 |  32.84 |
                           ---------+--------+--------+
                           TOTAL          85      134      219
                                       38.81    61.19   100.00
```

```
                                        S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                                  TABLE OF COL40 BY COL20_21

THIRD INJURY LOCATION                   COL40          COL20_21

                                        FREQUENCY|
                                         PERCENT |
                                         ROW PCT |
                                         COL PCT |      75|      76|  TOTAL
                                        ---------+--------+--------+
                                               . |    376 |    395 |      .
                                                 |      . |      . |      .
                                                 |      . |      . |
                                                 |      . |      . |
                                        ---------+--------+--------+
HEAD AND FACE  . . . . . . .                   2 |      0 |      1 |      1
                                                 |   0.00 |   1.33 |   1.33
                                                 |   0.00 | 100.00 |
                                                 |   0.00 |   1.89 |
                                        ---------+--------+--------+
NECK  . . . . . . . . . .                      3 |      4 |      3 |      7
                                                 |   5.33 |   4.00 |   9.33
                                                 |  57.14 |  42.86 |
                                                 |  18.18 |   5.66 |
                                        ---------+--------+--------+
CHEST  . . . . . . . . . .                     4 |      7 |     10 |     17
                                                 |   9.33 |  13.33 |  22.67
                                                 |  41.18 |  58.82 |
                                                 |  31.82 |  18.87 |
                                        ---------+--------+--------+
ABDOMEN  . . . . . . . .                       5 |      0 |      6 |      6
                                                 |   0.00 |   8.00 |   8.00
                                                 |   0.00 | 100.00 |
                                                 |   0.00 |  11.32 |
                                        ---------+--------+--------+
EXTREMITIES  . . . . . . .                     6 |     11 |     33 |     44
                                                 |  14.67 |  44.00 |  58.67
                                                 |  25.00 |  75.00 |
                                                 |  50.00 |  62.26 |
                                        ---------+--------+--------+
                                        TOTAL          22       53       75
                                                    29.33    70.67   100.00
```

```
                    S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                TABLE OF COL41 BY COL20_21

FOURTH INJURY LOCATION      COL41        COL20_21

                            FREQUENCY|
                             PERCENT |
                             ROW PCT |
                             COL PCT |      75|      76|  TOTAL
                            ---------+--------+--------+
                                   . |    388 |    437 |      .
                                     |      . |      . |      .
                                     |      . |      . |
                                     |      . |      . |
                            ---------+--------+--------+
CHEST  . . . . . . . . . 4           |      2 |      0 |      2
                                     |   9.52 |   0.00 |   9.52
                                     | 100.00 |   0.00 |
                                     |  20.00 |   0.00 |
                            ---------+--------+--------+
ABDOMEN . . . . . . . . . 5          |      2 |      2 |      4
                                     |   9.52 |   9.52 |  19.05
                                     |  50.00 |  50.00 |
                                     |  20.00 |  18.18 |
                            ---------+--------+--------+
EXTREMITIES . . . . . . . 6          |      6 |      9 |     15
                                     |  28.57 |  42.86 |  71.43
                                     |  40.00 |  60.00 |
                                     |  60.00 |  81.82 |
                            ---------+--------+--------+
                            TOTAL          10       11       21
                                        47.62    52.38   100.00
```

FIFTH INJURY LOCATION

```
                                        TABLE OF COL42 BY COL20_21

                              COL42          COL20_21

                              FREQUENCY|
                              PERCENT  |
                              ROW PCT  |
                              COL PCT  |      75|      76|  TOTAL
                              ---------+--------+--------+
                                     . |    394 |    447 |      .
                                       |      . |      . |      .
                                       |      . |      . |
                                       |      . |      . |
                              ---------+--------+--------+
ABDOMEN . . . . . . . . . 5            |      1 |      0 |      1
                                       |  20.00 |   0.00 |  20.00
                                       | 100.00 |   0.00 |
                                       |  25.00 |   0.00 |
                              ---------+--------+--------+
EXTREMITIES . . . . . . . 6            |      3 |      1 |      4
                                       |  60.00 |  20.00 |  80.00
                                       |  75.00 |  25.00 |
                                       |  75.00 | 100.00 |
                              ---------+--------+--------+
                              TOTAL           4        1        5
                                          80.00    20.00   100.00
                              S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                        TABLE OF COL43 BY COL20_21

SIXTH INJURY LOCATION            COL43        COL20_21

                                 FREQUENCY|
                                  PERCENT |
                                  ROW PCT |
                                  COL PCT |      75|      76|  TOTAL
                                 ---------+--------+--------+
                                        . |    397 |    446 |      .
                                          |      . |      . |      .
                                          |      . |      . |
                                          |      . |      . |
                                 ---------+--------+--------+
NECK . . . . . . . . . 2                  |      0 |      2 |      2
                                          |   0.00 |  66.67 |  66.67
                                          |   0.00 | 100.00 |
                                          |   0.00 | 100.00 |
                                 ---------+--------+--------+
EXTREMITIES . . . . . . . 6               |      1 |      0 |      1
                                          |  33.33 |   0.00 |  33.33
                                          | 100.00 |   0.00 |
                                          | 100.00 |   0.00 |
                                 ---------+--------+--------+
                                 TOTAL           1        2        3
                                             33.33    66.67   100.00
```

```
                    S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                   TABLE OF COL44 BY COL20_21

SAFETY HELMET USE            COL44         COL20_21

                             FREQUENCY|
                              PERCENT |
                              ROW PCT |
                              COL PCT |       75|       76|  TOTAL
                             ---------+---------+---------+
                                    . |       2 |       3 |      .
                                      |       . |       . |      .
                                      |       . |       . |
                                      |       . |       . |
                             ---------+---------+---------+
YES  . . . . . . . . . . . . . . .  1 |     332 |     166 |    498
                                      |   39.48 |   19.74 |  59.22
                                      |   66.67 |   33.33 |
                                      |   83.84 |   37.30 |
                             ---------+---------+---------+
NO   . . . . . . . . . . . . . . .  2 |      21 |     229 |    250
                                      |    2.50 |   27.23 |  29.73
                                      |    8.40 |   91.60 |
                                      |    5.30 |   51.46 |
                             ---------+---------+---------+
UNKNOWN  . . . . . . . . . . . . .  3 |      43 |      50 |     93
                                      |    5.11 |    5.95 |  11.06
                                      |   46.24 |   53.76 |
                                      |   10.86 |   11.24 |
                             ---------+---------+---------+
                             TOTAL         396       445      841
                                         47.09     52.91   100.00
                              TABLE OF COL45 BY COL20_21

SAFETY HELMET TYPE            COL45        COL20_21

                              FREQUENCY|
                               PERCENT |
                               ROW PCT |
                               COL PCT |      75|      76|  TOTAL
                              ---------+--------+--------+
                                     . |     22 |    231 |      .
                                       |      . |      . |      .
                                       |      . |      . |
                                       |      . |      . |
                              ---------+--------+--------+
PARTIAL . . . . . . . . . . . 2        |      1 |      1 |      2
                                       |   0.17 |   0.17 |   0.34
                                       |  50.00 |  50.00 |
                                       |   0.27 |   0.46 |
                              ---------+--------+--------+
UNKNOWN . . . . . . . . . . . 4        |    375 |    216 |    591
                                       |  63.24 |  36.42 |  99.66
                                       |  63.45 |  36.55 |
                                       |  99.73 |  99.54 |
                              ---------+--------+--------+
                              TOTAL         376      217      593
                                          63.41    36.59   100.00
```

```
                                        TABLE OF COL46 BY COL20_21

HELMET EJECTION ?                COL46          COL20_21

                                 FREQUENCY|
                                  PERCENT |
                                  ROW PCT |
                                  COL PCT |      75|      76|  TOTAL
                                 ---------+--------+--------+
                                        . |     22 |    232 |      .
                                          |      . |      . |      .
                                          |      . |      . |
                                          |      . |      . |
                                 ---------+--------+--------+
YES . . . . . . . . . 1                   |      6 |      7 |     13
                                          |   1.01 |   1.18 |   2.20
                                          |  46.15 |  53.85 |
                                          |   1.60 |   3.24 |
                                 ---------+--------+--------+
NO  . . . . . . . . . 2                   |    306 |    129 |    435
                                          |  51.69 |  21.79 |  73.48
                                          |  70.34 |  29.66 |
                                          |  81.38 |  59.72 |
                                 ---------+--------+--------+
UNKNOWN . . . . . . . 3                   |     63 |     80 |    143
                                          |  10.64 |  13.51 |  24.16
                                          |  44.06 |  55.94 |
                                          |  16.76 |  37.04 |
                                 ---------+--------+--------+
                                        4 |      1 |      0 |      1
                                          |   0.17 |   0.00 |   0.17
                                          | 100.00 |   0.00 |
                                          |   0.27 |   0.00 |
                                 ---------+--------+--------+
                                 TOTAL         376      216      592
                                             63.51    36.49   100.00
```

```
                              STATISTICAL ANALYSIS SYSTEM

                                   TABLE OF COL47 BY COL20_21

HELMET DAMAGE             COL47          COL20_21

                          FREQUENCY|
                           PERCENT |
                           ROW PCT |
                           COL PCT |      75|      76|  TOTAL
                          ---------+--------+--------+
                                 . |     22 |    230 |      .
                                   |      . |      . |      .
                                   |      . |      . |
                                   |      . |      . |
                          ---------+--------+--------+
YES  . . . . . . . .             1 |     60 |     24 |     84
                                   |  10.10 |   4.04 |  14.14
                                   |  71.43 |  28.57 |
                                   |  15.96 |  11.01 |
                          ---------+--------+--------+
NO   . . . . . . . . .           2 |    268 |    142 |    410
                                   |  45.12 |  23.91 |  69.02
                                   |  65.37 |  34.63 |
                                   |  71.28 |  65.14 |
                          ---------+--------+--------+
UNKNOWN  . . . . . . .           3 |     47 |     52 |     99
                                   |   7.91 |   8.75 |  16.67
                                   |  47.47 |  52.53 |
                                   |  12.50 |  23.85 |
                          ---------+--------+--------+
                                 5 |      1 |      0 |      1
                                   |   0.17 |   0.00 |   0.17
                                   | 100.00 |   0.00 |
                                   |   0.27 |   0.00 |
                          ---------+--------+--------+
                          TOTAL         376      218      594
                                      63.30    36.70   100.00
                          S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                    TABLE OF COL48_49 BY COL20_21
DRIVER'S AGE
                              COL48_49     COL20_21

                              FREQUENCY|
                               PERCENT |
                               ROW PCT |
                               COL PCT |      75|      76|  TOTAL
                              ---------+--------+--------+
                                     . |      9 |      6 |      .
                                       |      . |      . |      .
                                       |      . |      . |
                                       |      . |      . |
                              ---------+--------+--------+
1 TO 5 YEARS . . . . . . . . . . . . 1 |      2 |      3 |      5
                                       |   0.24 |   0.36 |   0.60
                                       |  40.00 |  60.00 |
                                       |   0.51 |   0.68 |
                              ---------+--------+--------+
6 TO 10 YEARS  . . . . . . . . . . . 2 |      2 |      1 |      3
                                       |   0.24 |   0.12 |   0.36
                                       |  66.67 |  33.33 |
                                       |   0.51 |   0.23 |
                              ---------+--------+--------+
11 TO 15 YEARS . . . . . . . . . . . 3 |     12 |     18 |     30
                                       |   1.44 |   2.17 |   3.61
                                       |  40.00 |  60.00 |
                                       |   3.08 |   4.07 |
                              ---------+--------+--------+
16 TO 20 YEARS . . . . . . . . . . . 4 |    112 |    135 |    247
                                       |  13.48 |  16.25 |  29.72
                                       |  45.34 |  54.66 |
                                       |  28.79 |  30.54 |
                              ---------+--------+--------+
21 TO 25 YEARS . . . . . . . . . . . 5 |    130 |    139 |    269
                                       |  15.64 |  16.73 |  32.37
                                       |  48.33 |  51.67 |
                                       |  33.42 |  31.45 |
                              ---------+--------+--------+
                              TOTAL         389      442      831
                                          46.81    53.19   100.00
```

DRIVER'S AGE
(CONTINUED)

```
                         TABLE OF COL48_49 BY COL20_21

                    COL48_49     COL20_21

                    FREQUENCY|
                    PERCENT  |
                    ROW PCT  |
                    COL PCT  |      75|      76|  TOTAL
                    ---------+--------+--------+
26 TO 30 YEARS . . . . . . 6 |     63 |     72 |    135
                             |   7.58 |   8.66 |  16.25
                             |  46.67 |  53.33 |
                             |  16.20 |  16.29 |
                    ---------+--------+--------+
31 TO 35 YEARS . . . . . . 7 |     27 |     33 |     60
                             |   3.25 |   3.97 |   7.22
                             |  45.00 |  55.00 |
                             |   6.94 |   7.47 |
                    ---------+--------+--------+
36 TO 40 YEARS . . . . . . 8 |     19 |     14 |     33
                             |   2.29 |   1.68 |   3.97
                             |  57.58 |  42.42 |
                             |   4.88 |   3.17 |
                    ---------+--------+--------+
41 TO 45 YEARS . . . . . . 9 |     10 |     10 |     20
                             |   1.20 |   1.20 |   2.41
                             |  50.00 |  50.00 |
                             |   2.57 |   2.26 |
                    ---------+--------+--------+
46 TO 50 YEARS . . . . . .10 |      7 |     11 |     18
                             |   0.84 |   1.32 |   2.17
                             |  38.89 |  61.11 |
                             |   1.80 |   2.49 |
                    ---------+--------+--------+
MORE THAN 50 YEARS . . . . 11 |      5 |      6 |     11
                             |   0.60 |   0.72 |   1.32
                             |  45.45 |  54.55 |
                             |   1.29 |   1.36 |
                    ---------+--------+--------+
                    TOTAL         389      442      831
                                46.81    53.19   100.00
```

```
                              S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                            TABLE OF COL50 BY COL20_21

SEX OF RIDER                        COL50         COL20_21

                                    FREQUENCY|
                                     PERCENT |
                                     ROW PCT |
                                     COL PCT |       75|       76|  TOTAL
                                    ---------+---------+---------+
                                          .  |       4 |       3 |      .
                                             |       . |       . |      .
                                             |       . |       . |
                                             |       . |       . |
                                    ---------+---------+---------+
MALE    . . . . . . . . . . . . . .       1  |     356 |     381 |    737
                                             |   42.43 |   45.41 |  87.84
                                             |   48.30 |   51.70 |
                                             |   90.36 |   85.62 |
                                    ---------+---------+---------+
FEMALE  . . . . . . . . . . . . . .       2  |      38 |      62 |    100
                                             |    4.53 |    7.39 |  11.92
                                             |   38.00 |   62.00 |
                                             |    9.64 |   13.93 |
                                    ---------+---------+---------+
UNKNOWN . . . . . . . . . . . . . .       3  |       0 |       1 |      1
                                             |    0.00 |    0.12 |   0.12
                                             |    0.00 |  100.00 |
                                             |    0.00 |    0.22 |
                                    ---------+---------+---------+
                                          5  |       0 |       1 |      1
                                             |    0.00 |    0.12 |   0.12
                                             |    0.00 |  100.00 |
                                             |    0.00 |    0.22 |
                                    ---------+---------+---------+
                                    TOTAL         394       445      839
                                                46.96     53.04   100.00
```

```
                        S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                    TABLE OF COL51 BY COL20_21

MOST SEVERE INJURY LOCATION    COL51          COL20_21

                               FREQUENCY|
                                PERCENT |
                                ROW PCT |
                                COL PCT |       75|       76|  TOTAL
                               ---------+---------+---------+
                                        |    261  |    255  |      .
                                        |      .  |      .  |      .
                                        |      .  |      .  |
                                        |      .  |      .  |
                               ---------+---------+---------+
GENERAL BODY  . . . . . . . 1           |     49  |     57  |    106
                                        |  14.85  |  17.27  |  32.12
                                        |  46.23  |  53.77  |
                                        |  35.77  |  29.53  |
                               ---------+---------+---------+
HEAD AND FACE . . . . . . . 2           |     24  |     56  |     80
                                        |   7.27  |  16.97  |  24.24
                                        |  30.00  |  70.00  |
                                        |  17.52  |  29.02  |
                               ---------+---------+---------+
NECK  . . . . . . . . . . . 3           |      3  |      3  |      6
                                        |   0.91  |   0.91  |   1.82
                                        |  50.00  |  50.00  |
                                        |   2.19  |   1.55  |
                               ---------+---------+---------+
CHEST . . . . . . . . . . . 4           |      4  |      9  |     13
                                        |   1.21  |   2.73  |   3.94
                                        |  30.77  |  69.23  |
                                        |   2.92  |   4.66  |
                               ---------+---------+---------+
ABDOMEN . . . . . . . . . . 5           |      2  |     10  |     12
                                        |   0.61  |   3.03  |   3.64
                                        |  16.67  |  83.33  |
                                        |   1.46  |   5.18  |
                               ---------+---------+---------+
EXTREMITIES . . . . . . . . 6           |     55  |     58  |    113
                                        |  16.67  |  17.58  |  34.24
                                        |  48.67  |  51.33  |
                                        |  40.15  |  30.05  |
                               ---------+---------+---------+
                               TOTAL          137       193      330
                                            41.52     58.48   100.00
```

```
                              S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                          TABLE OF COL52 BY COL20_21
SEVERITY OF THE
MOST SEVERE INJURY                COL52        COL20_21

                                  FREQUENCY|
                                   PERCENT |
                                   ROW PCT |
                                   COL PCT |      75|      76|  TOTAL
                                  ---------+--------+--------+
                                         . |    262 |    256 |      .
                                           |      . |      . |      .
                                           |      . |      . |
                                           |      . |      . |
                                  ---------+--------+--------+
0 = NO INJURY  . . . . . . . . 1           |     60 |     89 |    149
                                           |  18.29 |  27.13 |  45.43
                                           |  40.27 |  59.73 |
                                           |  44.12 |  46.35 |
                                  ---------+--------+--------+
1 = MINOR INJURY   . . . . . . 2           |     41 |     49 |     90
                                           |  12.50 |  14.94 |  27.44
                                           |  45.56 |  54.44 |
                                           |  30.15 |  25.52 |
                                  ---------+--------+--------+
2 = MODERATE INJURY . . . . . . 3          |     26 |     33 |     59
                                           |   7.93 |  10.06 |  17.99
                                           |  44.07 |  55.93 |
                                           |  19.12 |  17.19 |
                                  ---------+--------+--------+
3 = SEVERE INJURY  . . . . . . 4           |      3 |      7 |     10
                                           |   0.91 |   2.13 |   3.05
                                           |  30.00 |  70.00 |
                                           |   2.21 |   3.65 |
                                  ---------+--------+--------+
4 = SERIOUS INJURY . . . . . . 5           |      6 |     13 |     19
                                           |   1.83 |   3.96 |   5.79
                                           |  31.58 |  68.42 |
                                           |   4.41 |   6.77 |
                                  ---------+--------+--------+
5 = CRITICAL INJURY . . . . . . 6          |      0 |      1 |      1
                                           |   0.00 |   0.30 |   0.30
                                           |   0.00 | 100.00 |
                                           |   0.00 |   0.52 |
                                  ---------+--------+--------+
                                  TOTAL         136      192      328
                                              41.46    58.54   100.00
                              S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                           TABLE OF COL53 BY COL20_21

SECOND MOST SEVERE
INJURY LOCATION                  COL53         COL20_21

                                 FREQUENCY|
                                  PERCENT |
                                  ROW PCT |
                                  COL PCT |      75|      76|  TOTAL
                                 ---------+--------+--------+
                                        . |    313 |    313 |      .
                                          |      . |      . |      .
                                          |      . |      . |
                                          |      . |      . |
                                 ---------+--------+--------+
GENERAL BODY  . . . . . .               1 |     58 |     79 |    137
                                          |  26.36 |  35.91 |  62.27
                                          |  42.34 |  57.66 |
                                          |  68.24 |  58.52 |
                                 ---------+--------+--------+
HEAD AND FACE . . . . . .               2 |     11 |     13 |     24
                                          |   5.00 |   5.91 |  10.91
                                          |  45.83 |  54.17 |
                                          |  12.94 |   9.63 |
                                 ---------+--------+--------+
NECK  . . . . . . . . . .               3 |      1 |      5 |      6
                                          |   0.45 |   2.27 |   2.73
                                          |  16.67 |  83.33 |
                                          |   1.18 |   3.70 |
                                 ---------+--------+--------+
CHEST . . . . . . . . . .               4 |      5 |     10 |     15
                                          |   2.27 |   4.55 |   6.82
                                          |  33.33 |  66.67 |
                                          |   5.88 |   7.41 |
                                 ---------+--------+--------+
ABDOMEN . . . . . . . . .               5 |      2 |      3 |      5
                                          |   0.91 |   1.36 |   2.27
                                          |  40.00 |  60.00 |
                                          |   2.35 |   2.22 |
                                 ---------+--------+--------+
EXTREMITIES . . . . . . .               6 |      8 |     25 |     33
                                          |   3.64 |  11.36 |  15.00
                                          |  24.24 |  75.76 |
                                          |   9.41 |  18.52 |
                                 ---------+--------+--------+
                                 TOTAL          85      135      220
                                             38.64    61.36   100.00
                                 TABLE OF COL54 BY COL20_21

SEVERITY OF SECOND
MOST SEVERE INJURY             COL54         COL20_21

                               FREQUENCY|
                                PERCENT |
                                ROW PCT |
                                COL PCT |      75|      76|  TOTAL
                               ---------+--------+--------+
                                      . |    313 |    314 |      .
                                        |      . |      . |      .
                                        |      . |      . |
                                        |      . |      . |
                               ---------+--------+--------+
0 = NO INJURY  . . . . . . . 1          |     56 |     96 |    152
                                        |  25.57 |  43.84 |  69.41
                                        |  36.84 |  63.16 |
                                        |  65.88 |  71.64 |
                               ---------+--------+--------+
1 = MINOR INJURY.  . . . . . 2          |     21 |     27 |     48
                                        |   9.59 |  12.33 |  21.92
                                        |  43.75 |  56.25 |
                                        |  24.71 |  20.15 |
                               ---------+--------+--------+
2 = MODERATE INJURY . . . . . 3         |      5 |      5 |     10
                                        |   2.28 |   2.28 |   4.57
                                        |  50.00 |  50.00 |
                                        |   5.88 |   3.73 |
                               ---------+--------+--------+
3 = SEVERE INJURY  . . . . . 4          |      3 |      5 |      8
                                        |   1.37 |   2.28 |   3.65
                                        |  37.50 |  62.50 |
                                        |   3.53 |   3.73 |
                               ---------+--------+--------+
5 = CRITICAL INJURY . . . . . 6         |      0 |      1 |      1
                                        |   0.00 |   0.46 |   0.46
                                        |   0.00 | 100.00 |
                                        |   0.00 |   0.75 |
                               ---------+--------+--------+
                               TOTAL          85      134      219
                                           38.81    61.19   100.00
```

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                              S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                        TABLE OF COL55 BY COL20_21

THIRD MOST SEVERE INJURY
LOCATION                              COL55          COL20_21

                                      FREQUENCY|
                                       PERCENT |
                                       ROW PCT |
                                       COL PCT |       75|       76|  TOTAL
                                      ---------+---------+---------+
                                            .  |     376 |     395 |      .
                                               |       . |       . |      .
                                               |       . |       . |
                                               |       . |       . |
                                      ---------+---------+---------+
GENERAL BODY  . . . . . . . . . . . . . 1      |      10 |      38 |     48
                                               |   13.33 |   50.67 |  64.00
                                               |   20.83 |   79.17 |
                                               |   45.45 |   71.70 |
                                      ---------+---------+---------+
HEAD AND FACE . . . . . . . . . . . . . 2      |       4 |       3 |      7
                                               |    5.33 |    4.00 |   9.33
                                               |   57.14 |   42.86 |
                                               |   18.18 |    5.66 |
                                      ---------+---------+---------+
NECK  . . . . . . . . . . . . . . . . . 3      |       2 |       1 |      3
                                               |    2.67 |    1.33 |   4.00
                                               |   66.67 |   33.33 |
                                               |    9.09 |    1.89 |
                                      ---------+---------+---------+
CHEST . . . . . . . . . . . . . . . . . 4      |       1 |       1 |      2
                                               |    1.33 |    1.33 |   2.67
                                               |   50.00 |   50.00 |
                                               |    4.55 |    1.89 |
                                      ---------+---------+---------+
ABDOMEN . . . . . . . . . . . . . . . . 5      |       1 |       1 |      2
                                               |    1.33 |    1.33 |   2.67
                                               |   50.00 |   50.00 |
                                               |    4.55 |    1.89 |
                                      ---------+---------+---------+
EXTREMITIES . . . . . . . . . . . . . . 6      |       4 |       9 |     13
                                               |    5.33 |   12.00 |  17.33
                                               |   30.77 |   69.23 |
                                               |   18.18 |   16.98 |
                                      ---------+---------+---------+
                                      TOTAL           22        53       75
                                                   29.33     70.67   100.00
```

```
                                          TABLE OF COL56 BY COL20_21

SEVERITY OF THE THIRD          COL56        COL20_21
MOST SEVERE INJURY
                               FREQUENCY|
                                PERCENT |
                                ROW PCT |
                                COL PCT |        75|        76|  TOTAL
                               ---------+----------+----------+
                                      . |      376 |      397 |      .
                                        |        . |        . |      .
                                        |        . |        . |
                                        |        . |        . |
                               ---------+----------+----------+
0 = NO INJURY  . . . . . . . . 1        |       15 |       35 |     50
                                        |    20.55 |    47.95 |  68.49
                                        |    30.00 |    70.00 |
                                        |    68.18 |    68.63 |
                               ---------+----------+----------+
1 = MINOR INJURY  . . . . . . . 2       |        4 |       12 |     16
                                        |     5.48 |    16.44 |  21.92
                                        |    25.00 |    75.00 |
                                        |    18.18 |    23.53 |
                               ---------+----------+----------+
2 = MODERATE INJURY . . . . . . 3       |        2 |        3 |      5
                                        |     2.74 |     4.11 |   6.85
                                        |    40.00 |    60.00 |
                                        |     9.09 |     5.88 |
                               ---------+----------+----------+
3 = SEVERE INJURY  . . . . . . 4        |        1 |        1 |      2
                                        |     1.37 |     1.37 |   2.74
                                        |    50.00 |    50.00 |
                                        |     4.55 |     1.96 |
                               ---------+----------+----------+
                               TOTAL          22         51        73
                                            30.14      69.86    100.00
```

```
                          S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

                                      TABLE OF COL57 BY COL20_21
FATALITY CODE
                              COL57         COL20_21

                              FREQUENCY|
                               PERCENT |
                               ROW PCT |
                               COL PCT |       75|       76|  TOTAL
                              ---------+---------+---------+
                                  .    |     392 |     436 |      .
                                       |       . |       . |      .
                                       |       . |       . |
                                       |       . |       . |
                              ---------+---------+---------+
                                 1     |       6 |      12 |     18
                                       |   33.33 |   66.67 | 100.00
                                       |   33.33 |   66.67 |
                                       |  100.00 |  100.00 |
                              ---------+---------+---------+
                              TOTAL            6        12       18
                                           33.33     66.67   100.00
```